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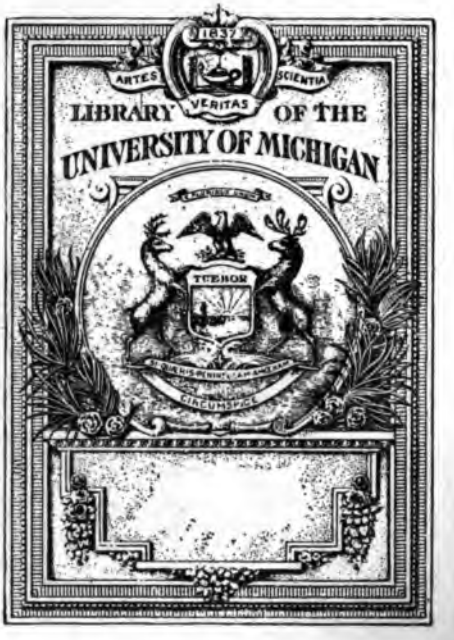
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VERHANDELINGEN

VAN HET

BATAVIAASCH GENOOTSCHAP

VAN

KUNSTEN EN WETENSCHAPPEN.

ACHTSTE DEEL.

TWEEDE DRUK.

Te BATAVIA,

TER LANDS DRUKKERIJ.

1826.

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NAAMLIJST
DER
TEGENWOORDIGE LEDEN
VAN HET
BATAVIASCHE GENOOTSCHAP.

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VOORBERIGT.

Van de vertraging der uitgave dezes VIIIsten deels is grootelijks de oorzaak eene meer dan gewone drukte ter pers, en gedeeltelijk mangel aan de vereischte soort van drukpapier. Aan stoffe heeft het thans wel niet ontbroken, daar nog zoo vele aan handen is, dat onder de vriendelijke bezorging van den Heer President, die naar Europa is vertrokken, aldaar de druk van een IXde deel zal bespoedigd worden.

Verloor het Genootschap veel bij het afsterven van zijnen luisterrijken Protector den GRAAF VAN MINTO, wiens naam bij ons steeds in eerbiedige en dankbare gedachtenis levendig blijven zal, nog meer van nabij gevoelt het den slag, die thans aan het zelve wordt toegebragt door het afscheid en vertrek van den zoo verdienstelijken President en edelmoedigen hersteller van deszelfs zaken, den Heer THOMAS STAMFORD RAFFLES. 's Mans zedigheid wederhoudt te dezer plaats de volle uitboezeming dier warme gevoelens van dankbare verkleefdheid, waarvan de boezems van alle Leden zijn doortrokken. Deszelfs ijver voor de eer en uitbreiding van het belang dezes Genootschaps, zijne gedurige aansporingen en opwekkend voorbeeld, bijzonder ook de minzaamheid van zijn edelaardig karakter zullen lang bij ons in genoegelijk aandenken wezen.

Ter uitdrukking eenigermate van die gevoelens werd in de Algemeene Vergadering van den 16den Maart 1816, na de neerlegging van het presidie besloten tot het volgend Adres:

To

THE HONORABLE

THO. S. RAFFLES, Esq.

&c. &c.

HONORABLE SIR!

On the occasion of your resigning the office which you have so long and so ably filled in the Literary Society of Batavia, the Members of that Society cannot refrain from expressing the sentiments of regret, which they feel, both for the causes which led to that resignation, and for the effect which they are apprehensive it may have on their future labours.

From the state of decay into which the Literary Society of Batavia had gradually fallen, owing to a combination of unfortunate circumstances, it was your active exertions and unwearied zeal in the promotion of literature and science that bid it rise once more,

HOOG EDELE HEER!

Bij gelegenheid der ontruiming van den zetel, door uwe Excellentie zoo lang en met zoo veel roem in het Letterkundig Genootschap van Batavia bekleed, kunnen de leden van hetzelve niet nalaten hun leedwezen te betuigen, zoo wel over de oorzaken welke tot die ontruiming hebben aanleiding gegeven, als over de gevolgen welke, dit duchten zij, daar uit voor hunne toekomstige werkzaamheden kunnen voortspruiten.

Uwe dadige bemoeijingen, Hoog Edele Heer, en uw onvermoeide ijver ter bevordering van Kunsten en Wetenschappen, hebben dit Genootschap doen opijzen uit den staat van verval, waar-

that favoured its proceedings, and has enabled it to resume its activity.

We acknowledge this with equal gratitude, and pride, sentiments, that with us will ever distinguish the period, while you presided over the Society, you have recalled to a new existence.

Allow us then, Honorable Sir, to offer you the sincere expressions of our respect, regard and attachment, of our anxiety to continue aided by your correspondence and assistance in Europe, of our warmest wishes for your complete recovery, and our hopes that in the career of active life, to which your eminent abilities will hereafter doubtless call you, you may have leisure to devote some part of your time to those Literary and Scientific pursuits, in which you are equally well qualified to take a

in hetzelve door eene zamenvloeijing van ongelukkige omstandigheden langzamerhand ge onken was.

Gij zijt het, Hoog Edele Heer, die deszelfs werkzaamheden begunstigende, hetzelve in staat hebt gesteld om weder dadig te zijn. Wij erkennen dit met dankbaarheid en hoogmoed, en deze gevoelens zullen in ons aandenken altoos onafscheidbaar zijn van het tijdperk, in hetwelk Uwe Excellentie het voorzitterschap bekleedde in eene Societeit, welke van uzelven een nieuw leven ontving.

Vergun ons dan, Hoog Edele Heer, u de opregte verzekeringen aantebieden van onzen eerbied, liefde en verkleefdheid, van ons innig verlangen om steeds door uwe briefwisseling en hulp in Europa geschraagd te worden, van onze vurige wenschen voor

conspicuous and important share.

Anxious to retain among us some durable memorial of the distinguished honor we are now to lose, we solicit your consent to authorize our Agents in London to procure your Bust for us, as soon as possibe after your arrival, to be placed in the Hall of our Society, in that vacant niche which was intended to receive the Bust of our late Noble and revered Patron the EARL OF MINTO; the hopes we entertained on this point, having been, alas! disappointed, by the fatal event which deprived us of his distinguished Patronage and Protection, we turn to you, Honorable Sir, as alone worthy to replace him in our attachment and veneration.

het volkomen herstel uwer gezondheid, en van onze hoop dat in de werkzame loopbaan, tot welke uwe verhevene kundigheden U ontwijfelbaar zullen roepen, het in uwe magt zal zijn, een gedeelte van uwen tijd toetewijden aan die Letterkundige en Geleerde Oefeningen, in welke gij zoo wel geregtigd zijt een voornaam en belangrijk deel te nemen.

Verlangende in ons midden een duurzaam gedenkteeken te behouden van de onderscheidende eer, welke wij nu staan te verliezen, verzoeken wij verlof om onzen zaakgelastigden in Londen te mogen aanschrijven, zich zoo dra mogelijk na uwe aankomst aldaar, ten onzen behoeve uwer Excellenties Borstbeeld aanteschaffen, om te worden geplaatst in de zaal van ons Genootschap in die ledige nis, wel-

ke bestemd was de Beeldtenis te ontvangen van wijlen onzen edelen en geëerbiedigden beschermer de *Graaf van Minto*— onze hoop ten dezen opzigte helaas! verijdeld zijnde, door het noodlottig voorval, dat ons zijne hooge bescherming ontroofde, wenden wij ons tot U, Hoog Edele Heer, als alleen waardig den overledenen in ons eerbiedig en liefdevol aandenken optevolgen,

We have the honor to be

Honorable Sir,

Your most obedient attached and

faithful Servants

By Order of the Society,

J. TH. ROSS, President.

B. VON LUTZOW, Vice President.

P. WEDDING, Dutch Secretary.

J. DUPUY, English Secretary.

Bij welke gelegenheid de heer *Raffles*, het volgend antwoord gaf:

Deeply impressed as I have always been with the sense of your kindness, and gratified as I have on all occasions felt at the flattering marks of your attention and regard, I must confess that I was wholly unprepared for the high compliment which you have now paid me.

To your kindness, rather than to any merit of my own, I must acknowledge myself exclusively indepted, and I hope you will believe me fully sensible of this distinction, which enhances in so great a degree the obligation which I am under to your society.

In my parting Address on resigning the chair, I have endeavoured to express my sentiments more fully, and I need only assure you that to whatever part of the world it may be my destiny to proceed, I shall always be as proud of the honour, as I shall certainly be benefited by the advantage of corresponding with your Society, and of promoting to the utmost of my ability your laudable views and pursuits.

I fear my Bust will be but a poor substitute for that which was once intended to adorn your hall, but however reluctant I feel to acknowledge myself worthy of this further mark of your flattering attention, I owe you too much respect to deny your request.

Accept, Gentlemen, the sincerest assurances of my esteem, regard and affection.

Believe me I shall ever retain a grateful and pleasing recollection of your kindness and of the hours of intellectual enjoyment I have passed in your Society.

May every success attend you!

Bij vorige gunstbewijzen heeft zijne goedheid hog onlangs gevoegd een geschenk van verscheidene Braminsche en andere oudheden, als mede eene partij nuttige boeken en inlandsche handschriften.

Ook andere Leden hebben zich door toegezegde vereeringen onderscheiden.

Edelmoedige geschenken van zulken aard zullen steeds met genoegen ontvangen en dankbaar erkend worden.

INHOUD

VAN HET *8ste* DEEL,

Behalve het Voorberigt en de Naamlyst.

1.—Discourse of the Honorable the President THO. STAMFORT RAFFLES.

2.—Uittreksel uit eene Verhandeling van wylen den Heer *F. van Boekholtz*, over den Javaan in het Ooster-gedeelte des Eilands.

3.—Chymicale ontleding van het warm water te Tjipannas door *S. C. Kriel* en *John Scott*, M. D.

4.—Short account of the Medical plants of Java, by Doct. *Tho. Horsfield.*

5.—On the Mineralogy of Java, Essay I. by Doct. *Tho. Horsfield.*

6.—Essay on the Geography, Mineralogy and Botany of the Western portion of the territory of the native of Java, bij the same.

7.—An inscription from the Kawi, or ancient Javanese Language rendered into English by Mr. *Crawfurd.*

8.—Copies of two of the ancient inscriptions on copper plates, &c.

9.—Byna woordelijk Translaat van een Javaansch Geslacht-register van de vorsten van Java.

10.—Narrative of the effects of the eruption from the Somboro Mountain in the Island of Sumbawa on the 11the and 12th of April 1815.

A

DISCOURSE

Delivered on the 11th September 1815.

BY THE HONORABLE

THOMAS STAMFORD RAFFLES,

PRESIDENT.

GENTLEMEN,

A SERIES of domestic afflictions, alas! but too well known to you all, have followed in such quick succession to the melancholy event which it has long been my duty to communicate, that until the present hour I have felt myself in every way unequal to the trying task of publicly announcing to you the death of our noble and enlightened patron the late EARL OF MINTO; an event so unlooked for, and so painfully calamitous in its immediate effects, that, to use the energetic language of Mr. *Munshe*, it *obliged us*, as it were, *to close our lips before the Almighty!*

For how difficult was it to be reconciled to our wishes, and to our natural conceptions of right and wrong, that a man of such public and private worth should have been lost to his country and snatched away from the embraces of his friends and family at the very moment he was to receive the only reward, which in this world could recompense his past labours—a calm and placid recollection of the arduous, but success-

ful career he had run? How difficult was it to be reconciled to our ideas of remunerative justice, that the man who had so successfully served his country, should only live to see his triumphs completed, but not allowed to enjoy them,—that he should not even have been allowed to live the necessary space of time, to make the extent of his services known, and to describe the nature of the conquests he had made? And if, in this instance, it may occur that the public and the nation, is, if not more, at least as much the sufferer as the individual, how again is it to be reconciled to individual desert, that a man so eminent in private and domestic virtue, who had been seen, descending from the high station which he held, hastening in person to the pestilential shores of Batavia, administering on the way every aid and assistance to a sickly son, and who, after this beloved son fell a sacrifice, knew how to tranquillize his mind by the most elegant and consoling reflection, *that his death was the first and only grievance which either this son or any of his children had ever inflicted on their parents*—that this father blessed with such a family, and with such a sense of domestic felicity, should be snatched away by death, almost in sight of his home, and while they were stretching forth their arms to receive and embrace him?

If not so strong and intense in their feeling, yet of the same nature, and more extensive in their operation, were the ties which attached him to this Colony—to the whole community of Java—and especially to our Society—a tender and parental care for the Island of Java, was publicly avowed on different occasions—the proofs of it

were received—the European community was saved and preserved by his humanity and on his responsibility—for the Native administration principles were laid down, on which the whole of the present structure has been raised; and in every instance a wish was evinced of improving the successes of war, as much in favor of the vanquished as of the conqueror.

It would not be proper on this occasion to enter into particulars, but who does not gratefully recollect the general tenor of his Lordship's conduct and demeanour while on Java; administering aid and assistance with his own hands to the maimed and wounded of his enemies, setting, in the midst of his successes, an example of moderation and simplicity of manner, even to the vanquished—proceeding often in public without any other signs of greatness and distinction, than what the whole community singly and jointly were eager to shew him—never missing an opportunity of doing even a temporary good; and conciliating by these means the minds of the public to such a degree, that enemies were rendered friends, and that the names of Conqueror and Subduer were lost in those of Protector and Liberator—How hard therefore was it for the befriended and protected to lose their Protector and Liberator; and for the Protector himself not to be allowed to see the fruits of his benevolence come to a proper maturity!

But, however deeply we may, from these reflections, be led to bewail this melancholy event, let us beware not to murmur against the ways of Providence—nothing would be more unbecoming a Literary and Scientific society.—Let us rather

draw from all these circumstances, the consoling reflection that as Divine Justice will never fail, and full compensation seemed to be wanting on this side the grave, the deficiency will be amply filled up in another state, where life, bliss and happiness will be everlasting.

Having paid this humble tribute to the memory of our departed patron, I proceed to notice the result of those enquiries which have either been set on foot by the Society, or have fallen under its immediate observation in the various branches of its pursuits, since I had last the honor of publicly addressing you.

At that period Dr. *Horsfield* had, under instructions from Government, just commenced his laborious exertions on Banca—we have since seen those exertions brought to a close, and I have to report the collection of the most complete information regarding the position, constitution and productions of that important Island; the state of Society has not been omitted in the investigation, and satisfactory data have been furnished on which to estimate the present condition of its Inhabitants, as well as to contemplate plans for their progressive advancement in civilization and happiness.

It is during the later periods only of the European Establishments in the East, that Banca has attracted notice—the discovery of the Tin Mines about the twelfth year of the last century first gave it celebrity, but we can only date the commencement of scientific investigation or of European control from the period of its cession to the British Government in 812. The Dutch Government, it is true, set on foot various enquiries at different periods, and some accounts

of the population and produce of the country is contained in the earlier volumes of our transactions, but those views being confined to commercial objects, and the despotic sway of the Native Government of Palembang still remaining obsolute, but little was known of the country beyond the extent of the produce in Tin which it could annually export.

In explanation of the geographical description, and in order to point out the places referred to in the descriptions of the Mines, and in the detail of the Mineralogical and Botanical remarks, Dr. *Horsfield* has constructed the outline of a Map, in which are laid down the principal Rivers, the Mountains and ridges of Hills, with the settlements of the Malays and Chinese, and the devisions adopted by the original Inhabitants.

After entering into a detailed geographical account of the Island, and furnishing statistic tables of the population and produce, Dr. *Horsfield* proceeds to a narrative of the Mineralogical appearances, as explanatory of the constitution of the Mines and of the geological history of the country.

On the Mineralogical constitution of Banca, he observes that the direction of the Island being from North West to South East, it follows not only the direction of Sumatra and the Malayan Peninsula, but the large chain of Asiatic Mountains, one of the many branches of which terminates in Ceylon, while another traversing Arakan, Pegu, the Malayan Peninsula, and probably Sumatra, sends off an inferior range through Banca and Billiton, where it may be considered to disappear. The elevated parts of

Banca are observed to have the same constitution as the great continental chain, being composed principally of Granite—next to these occurs a species of Rock, which he terms *red Iron Stone*, extensively distributed on situations of secondary elevation, in single Rocks, or in veins of many united together covering large tracts of country—tracts composed of this Stone are bounded by Alluvial Districts, which are again subdivided into such as are formed of waving Hills gradually rising on each other, apparently of prior formation, and of such as are low and level, of recent origin, and confining the discharge of rivers. Those Districts which occur in *juxta* position of the primitive portions filling the space between these and the veins of *red Iron Stone*, or again between those and the alluvial parts, are stratified—the strata being uniformly horizontally arranged.

It is through these horizontal strata that the Tin ore is represented to be disseminated, and as far as has hitherto been remarked, it appears to lie either immediately under the surface, or at no great distance below it.

Another section of the report contains a view of the Tin mines, exhibiting a general enumeration of those worked at present or in former periods, with an account of the process of mining and of the economy of the mines.

The process of mining on Banca, is remarkable for its simplicity;—it consists in an excavation of a square or oblong form, made by digging perpendicularly to the beds or strata containing the Ore, and in a proper application of the water to facilitate the labours of the Miners and the washing of the Ore—there is no neces-

sity, as in other countries, where the metal lies concealed in deep veins, to have recourse to difficult operations or expensive machinery—the process, indeed, requires so little previous instruction, that it is mostly performed by persons whose only qualification is a robust constitution—a favorable spot being selected, the pit is sketched out—a canal conducted from the nearest rivulet, and the miners excavate until they arrive at the stratum containing the Ore—this is then deposited in heaps near the water, so as to be conveniently placed for washing; the aqueduct is lined with the bark of large trees, and a stronger current being produced by the admission of more water, the heaps are thrown in and agitated by the workmen—the particles of Ore subsiding by means of their gravity, and the earth being carried away by the current.

When a sufficient quantity of Ore is thus accumulated, the process of smelting commences—this is also very minutely and accurately described by Dr. *Horsfield*. It is unnecessary to observe that almost all the operations connected with the process of mining and the refining of the metal are performed by Chinese.

In his Botanical pursuits Dr. *Horsfield* has been peculiarly successful, his descriptions comprising a collection of upwards of 500 plants, of which sixteen appear to be of doubtful genera.

An account of the Inhabitants, their mode of life and occupations, the state of agriculture, and the history of the different settlements, is introduced into this valuable report, which I hope will shortly appear in print under the lib-

eral patronage and support of the East India Company. In this expectation, and that I may not diminish the interest excited in its favor, or exceed the latitude with which I am vested, by more extensive drafts on the interesting information which it contains, I shall close these notices on Banca by a short account of the extent and character of the population, as it appeared to Dr *Horsfield* at the early period of the establishment of European influence.

The Inhabitants of Banca consist of Malays, Chinese, Orang Gunung, or mountaineers, and Rayads (Orang Laut) or sea people. The Malays are few in number, of a peaceable disposition, but indolent, and of little importance in the affairs of the Island. The Chinese preserve, on Banca, their original habits of industry, enterprize and perseverance; they are the most useful among the Inhabitants, and indispensable in the labours of the mines. The general character of the *Orang Gunung*, or mountaineers, the original and, perhaps, most interesting portion of the population, is rude simplicity; dispersed over large tracts in the interior of the country, they live nearly in a state of nature, but submit without resistance to the general regulations which have been established, and willingly perform the labours required of them, altho' their natural timidity and wandering habits render them in a considerable degree inaccessible to Europeans. The *Rayads* are the remains of a peculiar race of people so called, living with their families and household in small prows in the Baya of Jebus and Klabut, and obtaining a subsistence by fishing and adventure; particulars of the habits and dialects of both the

mountaineers and Rayads will form a separate notice.

On *Borneo* if we have not derived the advantage of scientific enquiry, we have yet added considerably to our stock of information, in a more correct knowledge of the character and habits of the Native population, in the collection of Vocabularies of many of the dialects of the country, and in the attainment of many interesting particulars regarding the extensive Colonies of Chinese by which the gold mines are worked.

Some notices have been received of ruins of Temples, statues, and dilapidated cities, and of the existence of various inscriptions in different parts of the Country, in characters unknown to the Chinese, Malay or Dayac; but the information yet received is too vague, and, in some instances, too contradictory to be relied upon; and the question whether this Island, at any former period, rose to any considerable degree of greatness, must yet remain undecided—Embanking, as it were, the navigable pathway between the Eastern and Western Hemispheres, and lying contiguous to the most populous regions of the globe, China and Japan, there can be little doubt but at one period she must have risen far above her present state of degradation and neglect That Borneo was visited many centuries ago by the Chinese and Japanese is well established, but whether the Country was ever more extensively colonized by either of those Nations than it is at present from China, must be left to future enquiry. Porcelain, Jars, Plates, Vases, and Earthen utensils of various descriptions, the manufacture

of China and Japan, are frequently discovered in different parts of the Country, and such is the veneration in which these articles, so found, are held, that a single Jar of this description has been known to be purchased by the Dayacs of the interior for a sum not far short of two hundred Pounds Sterling; these Jars are prized by the Dayacs as the supposed depositaries of the ashes of their forefathers.

I would here notice the information collected regarding the different tribes of Dayacs wich have come under observation, did not the detail appear misplaced in the very general view which I am of necessity compelled to take of the subject—I wil only observe, that from a comparative vocabulary of as many of their dialects as are at present attainable, they appear to differ but little from the Malayan; that of the numerous tribes described by name and peculiarities, several are represented as tattooed, and that some are noticed with curled hair, an resembling the Papuas.

In the vicinity of Banjar-masin no opportunitz has been lost of improving our intelligence, Mr. *Alexander Hare*, the fouder of the interesting Colony established in the Southern part of the Island, has himself penetrated across the South Western Peninsula, and as confidence increases, we may look to a more extensive intercourse with the rude and scattered tribes of the interior.

In a former discourse, I took occasion to notice that the most prominent people on *Celebes* were the Bugis and Macassar; that, though speaking different languages, they adopted the same peculiar written character, and that the Maho-

medan religion prevailed generally in those parts of the Island, which might be considered to have at all advanced from a state of barbarism.

Confining our observations to the South Western limb, of this whimsically shaped Island, we may infer, that notwithstanding the country has greatly declined since its intercourse with Europeans, it my stil be reckoned populons compared with many of the Islands of the East —the population has been roughly estimated at about a Million, but the data on which this estima e was formed are not to be unreservedly relied upon.

About the period of the first arrival of Europeans in the East, the Macasar and Bugis tribes were among the principal dealers in spices, and the Isle of Celebes was nearly under the authority of a single sovereign. On the breaking down of this great Empire, several of the minor states submitted to European Administration, while the support given to the authority of Boni, and the monopoly of the spice trade by Europeans, effectually reduced the political influence of the ancient state of Goa.

The most ancient state of which tradition makes mention on Celebes is Luhu or Luwu, situated in the inner part of the Bay of Boni, and their Galigas or Historical romances are replete with the adventures and exploits of *Sawira Gading*, the first chief of that country, and who is said to have extended his dominions to the straits of Malacca—next to Luhu, the Empire of Goa has the greatest claims to antiquity, and a period is mentioned when this state extended its influence to Achin, Manda, Sulu, Ternate, and the whole of the Spice Islands.

2. In 1663 Rajah Palaka visited Batavia, and in 1666 co-operated with the Dutch Government against the native states on the coast of Sumatra; from this period the authority of Boni advanced, until the recent arrangements by the British Government.

1 The Macasar and Bugis tribes are known to be the most bold, adventurous, and enterprizing of all the Eastern Nations— they were formerly celebrated for their fidelity and their courage, and for this reason were employed as the Swiss in Europe, not only in the armies of Siam, Gamboia, and other countries, but also as guards to their Princes.

The most singular feature in the constitution of Society on Celebes is that of an elective Monarchy, limited by an Aristocracy generally hereditary, and exercising feudal authority over the minor chiefs and population, at all times prepared to take the field—a constitution of Society which, however common to Europe, is perhaps, without parallel in Asia, where from the influence of climate, religion and political institutions, we seldom witness any considerable departure from the despotic sway of one individual. The whole of the states on that portion of Celebes to which I have alluded, are constituted on this principle—the Prince is chosen from the royal stock by a certain number of Counsellors who also possess the right of subsequently removing him—these Counsellors are themselves elected from particular families of the hereditary Chiefs of provinces, and such is their influence, that the Prince can neither go to war nor indeed adopt any public measure except in concert with them; they have the charge

of the public Treasure, and also appoint the Prime Minister. The Prince cannot himself take the personal command of the Army, but the usage of the country admits of a temporary resignation of office for this purpose—in which case a Regent succeeds provisionally to the rank of Chief, and carries on the affairs of Government in concert with the majority of the Council—women and minors are eligible to election in every department of the State, from the Prince down to the lowest chief, and when this takes place, an additional officer, having a title which literally means support or prop, is appointed to assist. Some variation is observable in the different States—In Boni the Prince is elected by the *Orang Pitu* or seven hereditary Counsellors—In Goa the Prince is chosen by 4 Counsellors, of whom the first Minister, termed *Bechara Buta*, is one—This last officer is himself first appointed by the Council of Nine, termed the nine farmers of the country, but in the exercise of his office possesses very extraordinary powers—he can even remove the Prince himself, and call upon the electors to make another choice; the inferior chiefs or *krains* who administer the dependent provinces, are appointed by the Government, and not elected by a Council, although in the exercise of their office their power is in like manner limited; the number of the Council varying in different provinces from two to seven.

War is decided upon in the Council of the State, and so forcibly is the desperate ferocity and barbarism of the people depicted by the conduct they observe on these occasions, and in their subsequent proceeding towards their enemies,

that, however revolting the contemplation of such a state of Society may be, it forms too striking a trait in their character to be omitted —War being decided upon by the Prince in Council, the assembled chiefs, after sprinkling their banners with blood, proceed to take a solemn Oath, by dipping their Criss in a vessel of water, and afterwards dancing around the bloody banner, with frantic gesture and a strange contortion of the body and limbs, so as to give the extended Criss a tremulous motion; each severally imprecates the vengeance of the Deity against his person, if he violates his vow---an enemy is no sooner slain, than the body is decapitated, and treated with every indignity which the barbarous triumph of savages can dictate; the heads are carried on poles, or sent in to the Lord Paramount.—Some accounts go so far as to represent them devouring the *raw* heart of their subdued enemy, and whatever shadow of doubt humanity may throw over this appalling fact, it cannot be denied that their favorite meal is the raw heart and blood of the deer; this repast is termed *Lor Dara*, or the feast of the *Bloody Heart*, which they are said to devour, as among the Battas, in the season when limes and salt are plenty.

This, however, is viewing them on the worst side of their character, with immediate reference to their conduct in war, and to practices found to prevail among that portion of the population labouring under the restrictions on foreign commerce there are other points of view in which it may be more favorably considered.

The inhabitants of the Wadju Districts in particular, are celebrated for their enterprize

and intelligence—extending their commercial speculations, with a high character for honorable and fair dealing, from the Western shores of Siam to the Eastern coast of New Holland. Women, as before observed, take an active part in all public concerns, and are in no instances secluded from Society, being on a perfect equality with the men—the strongest attachment that is conceivable is felt for ancient customs, and reliques of antiquity are held in the highest possible veneration—they are slow and deliberate in their decisions but these once formed, are final. Agreements once entered into, are invariably observed on their part, and a Bugis is never known to swerve from his bargain—that natural politeness which characterizes the various nations and tribes distinguished by wearing the Criss, is no where more forcibly exhibited than among the inhabitants of Celebes—their minor associations are held together by all the attachment and warmth which have distinguished the clans of North Britain;—the same bold spirit of independence and enterprize distinguishes the lower orders---whilst the pride of ancestry and the romance of chivalry are the delight of the higher classes—attached to the chase as an amusement, rather than as the means of subsistence, the harvest is no sooner reaped, than each feudal chief, with his associates and followers, devotes himself to its pursuits ---The population being equally at the command of the Feudal Lord, whether in time of peace or war, agricultural pursuits beyond what may procure a bare subsistence, are but little attended to;-the usual share of the Crop, to the

dispo al of the chief, is a tythe termed *Sima*, this, with a few Imposts in the Bazars, and the services of the people, constitute the revenue of the state.

The languages and literature of the Celebes require a more extended and detailed view than it is possible to take of either on the present occasion. I shall therefore only briefly observe that the language prevalent throughout these states appea s at no very remote period to have been the same, but that the various revolutions which first raised the power of Goa, and subsequently elevated that of Bom to a still higher importance, have, in separating the States under two distinct authorities, given rise to two prevailing dialects, now assuming the appellation of two distinct languages—the language of Goa or Macassar is peculiarly soft, and is considered to be the most easy of acquisition, but not to be so copious as that of the Bugis—whether the Bu is language contains any portion of a more ancient language than either (of which traces are said to exist in some old Manuscripts of the cou try,) or, from commercial intercourse with other states, has adopted more foreign terms, is yet to be determined —the written character is nearly the same, the Macassars, however, using more consonant sounds than the Bugis—the same practice of softening the abrupt or harsh sound of a word ending in a consonant, by attaching a final A or O, so generally in almost every tongue of the Archipelago, is common to, and, I believe, invariably observed in both these languages.

The possible existence of a language distinct from and anterior to those now in use, is a sub-

ject well deserving enquiry—the Bugis trace back to *Sawira Geding*, who they represent to have proceeded in immediate descent from their heavenly mediator, Bitara Guru, and to have been the first chief of any celebrity on Celebes—he reigned, as I before observed, over Luhu, the most ancient kingdom on Celebes, and a lapse of time equal to seven descents, is said to have taken place before the establishment of Boni—both this chieftain, and the founder of the empire of Goa, are represented to have been great navigators and foreigners, (or according to the romance of native tradition, Deities sent from Heaven to govern and take care of them.) The inhabitants of Macassar have no idea by what means and at what period the present form of Government, of the nine *Glarang*, and the *Bichara Buta* of Goa, was established

Literary compositions in both the Macassar and Bugis languages are numerous—these consist principally of historical accounts of the different states, since the introduction of Mahometanism, which is represented to have taken place so late as the early part of the 16th century; of *Galigas* or collections of traditions, regarding more early times, of romances and poetical compositions, in which love, war, and the chace, are the favorite theme—they possess a paraphrase of the Koran, and several works, evidently translated from the Javanese and Arabic, and many in common with the Malayu—works on judicial astrology, collections of institutions and customs which have all the force of law,—and each principal state adopts the practice of duly

recording every public event of importance as it occurs.

I shall not longer detain you with notices on our external relations while so wide and interesting a field attracts attention at home;—on Java, and that range of Islands, which modern geographers have classed under the denomination of the Sunda Islands. I have hitherto refrained from noticing the extensive traces of antiquity, foreign intercourse, and national greatness, which are exhibited in the numerous monuments of a former worship, in the ruins of dilapidated cities, in the character, the institutions, the language, and the literature of the people, in the hope that abler pens would have attempted a more correct sketch than either my humble abilities or limited information enable me to contemplate or embrace; the subject is so extensive, so new, so highly interesting, that I must claim your indulgence, if, in aiming at conciseness in representing the appearances and facts which have most forcibly struck my attention, many still more important particulars pass unnoticed.

On the peculiar province of Dr. *Horsfield*, to whom I am indebted for whatever information I possess on the Natural History of the Island, I shall not further trespass than by adverting to the extensive and almost endless variety which these regions present in every branch of his pursuits. One observation, however, as connected with the earlier History of Java, in explaining the high fertility of its soil in comparison with that of the Malayan Peninsula and Sumatra may deserve notice in this place. From the result of every investigation yet made, the constitution

of Java appears to be exclusively Volcanic, without any admixture whatever of the primitive or secondary mountains of the Asiatic continent, while on the contrary, Sumatra, with Banca, as before noticed appears to be a continuation and termination of the immense chain of mountains which pervades great part of Asia, and runs off finally in a direction North West to South East. Java deviates from the direction of Sumatra and the peninsula of Malacca, in striking off directly West and East; in this direction it is followed by the larger Islands of Bali, Lombok, Sumbawa, Endi, Timor, and by many smaller, which contribute to constitute an extensive series; this direction, as well as the constitution of all the Islands enumerated, indicates the existence of an extensive volcanic chain in this part of the Globe, running many degrees almost parrallel with the equator. The consequences of Java being exclusively volcanic are, that while Sumatra abounds in Metals, Java, generally speaking, is destitute of them;* that while on Sumatra, there are many extensive tracts, sterile and unfavorable to vegetation, Java, with few excep-

* All the indications yet discovered confirm the assertion that the constitution of Java is unfavorable to metals. The only notice as to the existence of Gold or Silver is contained in the first Volume of the transactions of the Society, and the attempts on *Gunung Parang* in 1723, and on the *Mégé Mendung* in 1744, were soon abandoned. Iron Pyrites is found in small quantities in several districts, as well as red ochre, which, however, often contains so little Iron as scarcely to serve for the common purpose of a paint. The existence of mercury in the low lands of Damak, where it is distributed in minute particles through the clay of the Rice grounds, bounding one of the principal rivers in that District, cannot be considered as an indication of a mine or of ore of that metal.

tions, is covered with a soil in the highest degree fertile, luxuriant, and productive of every species of vegetation.

Referring to the ample details on the Mineralogy of Java, which the scientific and persevering exertions of Dr. *Horsfield* have enabled us to include in our present volume, I shall on this branch of our pursuits only observe that catalogues and collections of the varieties in the Mineral, Vegetable, and Animal Kingdoms, as they have been found to exist on Java, have been formed by this gentleman, who is at present engaged in exploring the districts lying to the East and South of Souracarta, with the view of completing materials for the natural history of Java—his *Flora Javana* is already far advanced; the Geography of plants is a subject to which he has particularly directed his researches. From the extensive range of the Thermometer between the high and the low lands, Java presents to the Botanist, at the least, six distinct associations of plants or floras, indigenous to as many climates, defined by their comparative elevation above the level of the Sea.*

If to the Naturalist Java exhibits these extensive and wonderful varieties, to the Antiqua-

* The height of the principal Mountains on Java is estimated at from seven to eight thousand feet above the level of the sea—several of them have been ascended, and measures are now in progress for ascertaining the elevation with some degree of accuracy—Lieut. *Heyland*, who has several times ascended Sindoro, observes ,, that on reaching the summit on the 2[illegible]th May 1813, the Sun had set and the thermometer of Fahrenheit stood at 36—during the night the thermometer varied between 36 and 44, and as the day broke in the morning of the 21st, it was at 26—a second thermometer at 30—he immediately proceeded to the lake, and found it covered with

rian, the Philologist and the Philosopher, she in like manner offers subjects of equal novelty and even of higher interest, whether we investigate the splendid remains of her Temples and her Cities, her Languages and her Literature, or the character, institutions and customs of her Inhabitants.

To attempt any satisfactory description of the various monuments of antiquity and of a former worship, which are to be found in almost every district of the Island, would be impracticable on the present occasion, and with the exception of a few notices, I must content myself with assuring you that however deficient we may be in scientific information, or in a knowledge of the Mythology sacred to which these monuments may have been reared, measures have been taken that a record, to be depended upon for exactness at least, should exist of the actual remains of Hinduism on Java—I am indebted to Captain *Baker*, who is now actively engaged in these pursuits, for the most accurate sketches of the present appearance of the most important of these ruins, as well as for ground plans and elevations of the principal Temples, with notices of much valuable information which is to be collected of their origin, object and history.

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ice of the thickness of about 2 Spanish Dollars—a piece of double this thickness, found some distance from the edge on the same lake, induced a belief that it had remained unthawed on the day preceding, and had now received the addition of a second night's frost—the water in the Soup-plates which had been used as Hot-water plates the evening before, was completely frozen through, and the ice the thickness of an inch "—On another excursion in Oct. 1814, the thermometers fell to 36 and 38—and ice formed on them after they had been immersed in water and exposed to the air.

You are aware that the most splendid of these monuments are to be found at Prambana, Boro Bodo and Singa Sari;—of the former an interesting description is given in the last volume of our Transactions, by our highly esteemed friend Colonel *Mackenzie*—circumstances have since admitted of a more minute investigation, and our information, as far as regards their present state, is much more complete—these extensive ruins hold claim to the highest antiquity, and considering the vicinity of the temples to have been the seat of the earliest monarchy on Java, I may be permitted, in the words of Captain *Baker*, to lament the contrast of the present times, with „ times long since past."—„ Nothing," he observes „ can exceed the air of melancholy, desolation, and ruin, which this spot presents; and the feelings of every visitor must be forcibly in unison with the scene of surrounding devastation, when he reflects upon the origin of this once venerated, hallowed spot; the seat and proof of the perfection of arts now no longer in existence in Java; the type and emblem of a religion no longer acknowledged and scarce known among them by name; when he reflects upon that boundless profusion of active, unwearied skill and patience, the noble spirit of generous emulation, the patronage and encouragement which the arts and sciences must have received, and the inexhaustible wealth and resources which the Javanese of those times must have possessed."

In attempting to describe the Chandi Sewo or Thousand Temples, which form a principal part of these ruins, he laments his inability to convey any adequate ideas, satisfactory to his own mind, even of the actual dismantled state

of this splendid seat of magnificence and of the arts.—„ Never," he observes „ have I met with such stupendous, laborious and finished specimens of human labour, and of the polished, refined taste of ages long since forgot, and crowded together in so small a compass, as characterize and are manifested in this little spot; and though, I doubt not, there are some remains of antiquity in other parts of the globe more worthy the eye of the traveller, or the pencil of the artist, yet Chandi Sewo must ever rank with the foremost in the attractions of curiosity or antiquarian research."

I have preferred giving you the words of Captain *Baker*, while the subject was fully impressed on his mind, and while in the midst of the objects which he contemplated;—there is a feeling excited at such a moment that gives a colouring to the picture, and which is weakened in the faded tints of a more distant view.

Next to Prambana, the ruins of Boro Bodo may be ranked as remarkable for grandeur in design, peculiarity of style and exquisite workmanship;—this temple is in the District of Boro, under the Residency of the Kadu, whence I presume it takes its name, Bodo being either a term of contempt cast upon it by the Mahometans, or erroneously so pronounced, instead of *Budho*—which, in its general acceptation in the Javanese language, is synonimous with ancient or Heathen; it is built so as to crown the upper part of a small Hill, the summit terminating in a dome—the building is square, and is composed of seven terraces rising one within the other, each of which is enclosed by stone walls, the ascent to the different terraces

being by four flights of steps leading from four principal entrances, one on each side of the square. On the top are several small latticed domes, the upper part terminating in one of a larger circumference. In separate niches or rather temples, at equal distances, formed in the walls of the several terraces, are contained upwards of 300 stone Images of Devotees, in a sitting posture, and being each above three feet high. Similar images are within the domes above; in compartments on the walls, both within and without, are carved in relief, and in the most correct and beautiful style, groupes of figures, containing Historical Scenes and Mythological ceremonies, supposed to be representations of a principal part either of the Ramayan or Mahaborat—the figures and costume are evidently Indian, and we are at a loss whether most to admire the extent and grandeur of the whole construction, or the beauty, richness and correctness of the sculpture.

The name, and resemblance of the images which surround this temple to the figure of Buddha, has induced an opinion that it was exclusively confined to the worship of that Deity, but it should be noticed that in the immediate vicinity of this large temple, and evidently connected with it, are the remains of several smaller temples, constructed much after the fashion of the temples at Prambana, and containing a variety of sculptures and images of the Brahminical worship—a large but mutilated stone figure of Brahma was found in a field hard by, and as there are images similarly resembling Buddha to be found at Prambana, it would seem that if they are ascertained to represent

that Deity; these buildings must have been erected at a period when the worship was not separated.

Although the general design of this temple differs from those at Prambana, a similar style of sculpture and decoration is observable, and the same may be also traced to the ruins at Singa Sari, situated in the Residency of Pasaruan, where are till to be found images of Brahma, Mahadewa, Genesa, the Bull Nandi, and others, of the most exquisite workmanship, and in a still higher degree of preservation than any remaining at Prambanan or Boro Bodo.—One of the most extraordinary monuments in this quarter, however, is an immense colossal statue of a man resting on his hams, of the same character as the porters at Prambanan, lying on its face, and adjacent to a terrace, on which it was originally placed; this statue measures in length about 12 feet, breath between the shoulders 9½ feet, and at the base 9½ feet, with corresponding dimensions in girth, cut from one solid stone—the statue seems evidently to have fallen from the adjacent elevated terrace, altho' it is difficult to reconcile the probability of its having been elevated to such a station, with reference to any traces we now have of the knowledge of Mechanics by the Javanese—to have raised it by dint of mere manual labour would appear, at the present day, an Herculean task. The terrace is about 18 feet high. A second figure of the same dimensions have since been discovered in the vicinity of the above—and when the Forest is cleared some traces of the large temple to which they formed the approach,

may probably be found.—Not far from Singa Sari, which was once the seat of Empire, and in the district of Malang, are several interesting Ruins of Temples, of similar construction, and of the same style of ornament.

These Buildings must have been raised at a period when the highest state of the arts existed, and constructed at no very distant date from each other—considered in this view, they serve very forcibly and decidedly to corroborate the historical details of the country, which are found to exist the different written compositions and dramatic entertainments.

In noticing the more prominent remains of antiquity, as they are to be traced from the architecture and sculpture of former days, I should be wanting in attention, and indeed in a due respect to the popular tradition and the still received opinion of the Javans, did I not notice *Gunun Prahu*, a mountain or rather a range of mountains, for there are no less than 29 points which have distinct names, situated on the northern side of the Island, and inland between Samarang and Pacalongan, the supposed residence of Arjuno, and of the Demi-gods and Heroes who distinguished themselves in the B'rata Yud'ha, or Holy War—here the ruins of the supposed palace of the chief—the abode of Bima his followers and attendants, are exhibited, and so rich was this spot in relics of antiquity that the village of Kali Babar, situated at the foot of the Mountain is stated to have from time immemorial paid its rents gold, melted down from the golden images here discovered—so great indeed has been the desire to meet the *courtly thirst* for these interesting relics, that, I regret to

tay, many of the buildings composed of a material less in demand, have suffered permature dilapidation on this account.—Several interesting remains have recently been discovered by Majoor *Jonhson*, Resident at the Court of the Susunan; among these the ruins at Suku deserve particular notice—but I have already trespassed on a subject which it is impossible to treat well except in detail, and with reference to drawings of the extensive variety of erections, deities and attributes which abound throughout Java.

As connected with these early and splendid monuments of the former high state of the arts in Java, and illustrative of the history of the country, are to be noticed the great variety of inscriptions found in different parts of the Island—fac similies of most of these have been taken, and I am happy to add that we have succeeded in decyphering some of the most interesting.—The character on the stone found at Prambanan, is no doubt one of the Dewa Nagri characters of India—and with the exception of a few characters discovered at Singa Sari on the back of stone images, the only specimen yet discovered of this peculiar formation.

From the vicinity of the former Kingdom of Jong'golo, not far distant from the modern Surabaia, have been brought several large stones of the shape of English Tomb Stones, covered with inscriptions in the ancient Javanese character, and in the *Kawi* language; translations (or rather paraphrases, for they principally contain prayers and invocations to the Deity, in a language, the meaning of a few words only of which are retained, while the idiom and grammatical construction has long been lost,) have been made.

and will be found on the pages of our transactions—it has fallen to my lot to succeed not only in decyphering the MSS. recently discovered in Cheribon, but also the inscriptions on the copper plates so long deposited among the records of our Society as unintelligible; the results will be communicated to the Society in another form, and the subject will be more particularly adverted to, when speaking of the languages and literature

These inscriptions, which in general contain dates, are of the first importance in enabling us to trace the source whence the language and literature may have flowed, and to satisfy our minds of the prevailing worship at any particular period—It is only by an assemblage of as many data as can be collected, from this source, from the remains of the arts, from the language, literature and institutions of the people of the present day, compared with the best information we can procure of other countries of the East, which may have been civilized at an earlier period, that we can come at any fair and just result—the question is too extensive, too important to be lightly treated, or to be decided upon from any preconceived opinion or partial views.

Did not other striking and obvious proofs exist of the claims of Java to be considered at one period far advanced in civilization, it might be sufficient to bring forward the perfection of the language, the accession which that language must in early times have received from a distant but highly cultivated source, and the extensiveness for which it stands so peculiarly and justly distinguished.

On the Island of Java two general languages may be considered as prevalent.—The Sunda language, which prevails in the Western, and the Javanese, which is the language of the Districts East of Cheribon—the former is a simple dialect accomodated to all the purposes of the mountainous classes who speak it, and perhaps differs from the Javanese, not so much in its construction, as in the portion of original and of Malayan words which it contains; one fourth of the language, at the least, may be considered to be the same as the Javanese, another fourth is perhaps original, and the remaining half Malayan. At what period this extensive portion of the Malayan was adopted, or whether any part or the whole of this portion may not originally have formed the common language of this part of the country, is yet to be decided—In the Javanese, or language of the Eastern Division of the Island, and also of the lower parts of Bantam and Cheribon, the natural or vernacular language in like manner contains a considerable number of words in common with the Malayan, and the general principles of construction are found to have a striking accordance;—We thus find strong proofs in support of one common origin of the prevailing languages of the Archipelago—notwithstanding, a large portion of the Malayan words now used on Java may be ascertained to have been received at a comparatively recent date, and in the course of long and continued intercourse with the neighbouring countries.

The Javanese language, properly so called, is distinguished by a division between what may be considered as the vernaculat language of the

country, in use by the common people among themselves, and which is adopted when addressing and inferior, and what may be considered as a second or court language, adopted by all inferiors when addressing a superior. The same contruction, as well as the idiom of the language, is, I believe, pretty generally preserved in both the languages; the latter, however, consists of a more extensive class of foreign words which would appear to have been picked and culled for the purpose; where different words have not been found from the common language of the country, an arbitrary variation in the sound of the word belonging to the common language is adopted, as in changing the word *progo* into *pragi*, *dadi* into *dados*, *jawa* into *jawi* &c. and the more effectually to render the polite language distinct, not only are the affirmatives and negatives, as well as the pronouns and prepositions varied, but the auxiliary verbs and particles are in general different.

So effectually, indeed, does this arbitrary distinction prevail, that in the most common occurrences and expressions, the language that would be used by a superior bears not the slightest resemblance to what, with the same object, would be used by an inferior; thus when a superior would say to an inferior—"it is a very long time that you have been sick"—he would in the common or vernacular language use the words "*Lawas têmân goni loro*" while an inferior, using the court lauguage would to the same purport, say "*Lami lêras genipun sakit.*"—If the former would ask the question "your child, is it a boy or a girl?" he would use the worde "*Anak kiro wadon opo lanang?*".

the latter would express himself "*Putro hijang'an diko, estri punopo?*" again would the former observe "that the people of Java, both men and women, like to preserve the hair of head"—he would say "*Wong pulu Jawa lanang wadon podo ng'ing'u rambut*"—while the latter would use the words "*Tettang heng nusa Jawi estri jalar sumi ng'i ga rêm,*" &c.

It is not, however, to be supposed that these languages are so separated that the one is studied and attained exclusively of the other, for while one is the language of address, the other must be that of reply, and the knowledge of both is indispensible to those who have occasion to communicate with persons of a different rank with themselves. In the polite language, Kawi words are frequently introduced by the party, either to shew his reading, or evince a higher mark of respect—the Kawi is, however, more properly a dead language, the language of literary compositions of the higher class, and is to the Javanese what the Sanscrit is to the languages of Hindustan, and the Pali is to the Birman and Siamese; how far it may assimilate to either, must remain to be decided by more accurate comparison and observation than we have yet had opportunity to make. It is in this language that the more ancient and celebrated of the literary performances of the country are written, and it is probable that it will be found that while the general language of Java possesses, in common with all the more cultivated languages of the Archipelago, a considerable portion of Sanscrit terms, the court language is still more replete with them, and that the Kawi, and particularly that which is reckoned

most ancient, and which is decyphered from inscriptions on stone and copper plates, is almost pure Sanscrit; the construction and idiom in these inscriptions is no longer comprehended by the Javanese, and there are but few whose intelligence and acquaintance with the terms used enables them to give a faint notion of their meaning. Examples of these languages, taken from the B'rata Yud'ha, and from some of the inscriptions alluded to, will appear in the present volume.

To facilitate the acquirement of a language in its nature so extensive and varied as that of the Javanese, a method is adopted similar to what I understand is known in India, of classing the synonimes in such a manner as to connect them in the memory, by stringing them in classes according to the natural chain of our ideas; the collection or vocabulary so composed is termed *doso nomo*, literally *ten names*, and in point of fact there are but few words in the language which have not at least as many synonimes——an example of this mode of instruction and of assisting the memory is also included in the present volume, as illustrative not only of the method alluded to, but of the great delicacy and variety of the language.

I am happy to report that very extensive vocabularies, not only of both divisions of the Javanese, including the Kawi, but of the Sunda, and of the dialects of Madura and Bali, with notices of the varieties in particular districts and mountain tribes have been collected, and that whenever our more intimate acquaintance with the written compositions of the country, may afford the test of some experience in aid of

what has already been done, the grand work of a grammar and dictionary may be accomplished—this has long been our first and grand desideratum.*

In both the Sunda and Javanese languages the same written character is in use—and it has not yet been traced whether the former ever had a separate written character or not; at a place, however, called Batu Tulis, on the site of the ancient capital of Pajajaran, is preserved an inscription on stone in very rude characters—and several similar inscriptions in the same character have been recently discovered at Kwali in Cheribon, whither some of the descendants of the Princes of Pajajaran took refuge; this character till lately appeared widely different from any other yet noticed in Java, but is now found to contain some of the letters and vowel marks in common with the Javanese. The date inscribed on the stone at Batu Tulis has fortunately been decyphered, and the character was doubtless used by the Sunda people at the period of the destruction of the Western Government of Pajajaran.

No less than seven different characters are represented to have been in use at different periods of Javanese History—and although those at present adopted appear at first sight to be very different from the more ancient, on examination

* Considerable progres has been made since our last meeting in the acquirement of the Javanese Language—the Rev Mr. *Trout*, in particular, is prosecuting his studies at Samarang with great success, and arrangements are in progress for procuring from Bengal a fount of Javanese Types.

the one may without much difficulty be traced to the other by observing the gradual alterations made from time to time;—specimens of these different characters with the periods in which they were respectively used, are submitted to the inspection of the Society, and I regret that the absence of an engraver precludes them from appearing in the present volume of transactions.

The literature of Java, however much it may have declined in latter days, must be still considered as respectable—the more ancient Historical compositions are mostly written in the Kawi Language, to which frequently the meaning of each word and a paraphrase of the whole in Javanese is annexed—of these compositions those most highly esteemed are the *B'rata Yud'ha* or Holy War, and a volume entitled *Romo* or *Rama*, the former descriptive of the exploits of Arjuno and the principal Heroes whose fame is recorded in the celebrated Indian poem of the *Mahabarat*, the latter of those who are distinguished in the *Ramaijan*—these poems are held by the Javanese of the present day in about the same estimation as the Iliad and Odyssey of Homer are by Europeans—Until translations are made, and can be compared with the more extensive works in India, it would be premature to from any judgment on their relative excellence—the B'rata Yud'ha is contained in about two hundred verses, but in rendering the Kawi into Javanese, it is found necessary, in order to convey anij thing like the meaning, to render one line of Kawi into at least three of the modern Javanese, and I should not omit to mention that the belief is general among the Javanese that the seat of

this celebrated Romance was on Java—they point out the different countries which are referred to, such as Hastina, Wirata, and others in different districts of the Island, which have since assumed more modern names, and the supposed mansion of Arjuno, as before noticed, is still to be traced on Gunung Prahu.

These works, in common with almost every composition in the language, are composed in regularly measured verses, and as far as we can judge from the partial translations which have been made from them through the medium of the Javanese, they do credit to the power of the language and the genius of the poet.

Historical compositions are divided into two general classes, termed *Pakam* and *Babat;* under the former are considered the Romo and B'rata Yud'ha; institutions and regulations for Princes and the officers of State and Law, entitled Kopo Kopo, Jogol Muda and Kontoro; works on astronomy and judical astrology, termed Wuku; and works on moral conduct, regulations and ancient institutions, termed Niti Sastro and Niti Pro'o; under the *Babat* are classed cronological and other works on modern history since the Establishment of the Empire of Mataram.

There are in use for ordinary and popular compositions, five different kinds of regular measured Stanzas, termed *Tembang*, adapted to the subject treated of, whether heroic, amorous, or otherwise; these are termed *Asmoron Dono*, *Dandang Gula*, *Sinom*, *Durmo* and *Pangkur*. In the higher compositions and particularly in the Kawi, these measures are still more varied, and in number upwards of twenty, twelve of

which correspond in name with the Stanzas used inthe poetry of continental India.

In repeating these compositions, they are chaunted, or rather drawled out in regular metre according to rules laid down for the long and short syllables. Dramatic representations of various kinds from the constant recreation of the higher classes of Society, and the most polished amusement of the country; these consist of the *Waijang Kulit* or Scenic Shadows, in which the several heroes of the Drama, represented in a diminutive size, are made to perform their entrances and their exits behind a transparent curtain; the subjects of these representations are taken either from the more ancient works of the B'rata Yud'ha or Romo, and then denominated *Waijang Purwo*, or from the history of *Panji*, the most renowned Hero of Java story, and then termed *Waijang Gedog*. The *Waijang Wong*, in which men personify the heroes of the B'rata Yud'ha and Romo, is also termed *Waijang Purwo;* they have also the *Topeng*, in which men, wearing masks, personify those immortalized in the history of Panji, and the *Waijaug Klitik* or *Koritchil*, not unlike a puppet shew in Europe, in which diminute wooden figures personify the heroes of Majapahit.

These dramatic exhibitions are accompanied by performances on the *Gamelan*, or musical instruments of the Javanese, of which there are several distinct sets; the *Salindro*, which, accompanies the performances from the B'rata Yud'ha and Romo, as well as the Topeng; the *Pelog* which accompanies the Wayang Gedog, the *Kodok Ngokek*, *Chara Bali*, *Senenan* and

others; the Javanese Music is peculiarly harmonious, but the Gamut is imperfect.

Whatever portion of astronomical science may have in former times been communicated to Java, the people of the present day have no pretensions to distinction on this account; it is true they possess the signs of the Zodiac, and still preserve a mode of calculating the seasons, the principles of which must have been discovered by a people well acquainted with the motions of the heavenly bodies; they also possess several works on judicial Astrology, but in this they follow only what is laid down for them in the few pages of a book almost illegible, and in the tradition of the country.*

It was my intention in this place to have attempted some sketch of the interesting and peculiar features of the Javanese character, with reference to those admirable institutions which distinguish the constitution of society among this people; but I have already trespassed too long upon your kindness—and there are two

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* The signs of the Zodiac, as represented in the ancient MS. discovered at Telaga in Cheribon, compared with the Indian Zodiac, are as follows:—The figures being very correctly drawn, and the names with the explanation annexed to each.

INDIAN.	JAVANESE MS.
Mesha—the Ram	Misa.
Vrisha—the Bull	M'risa.
Mithuna—the Pair	M'ri Kogo (a butterfly).
Carcata—the Crab	Calicata.
Sinha—the Lion	Singha.
Cunya—the Virgin	Canya.
Tula—the Balance	Tula.
Vrishchica—the Scorpion	Privita.
Danus—the Bow	Wanu.
Macara—the Sea Monster	Macara (Crawfish).
Cumbha—the Water Jug	Cuba.
Mina—the Fish	Ména.

subjects which have recently attracted my particular attention, and which, on account of their novelty, I am desirous of bringing to your notice—during my late tour through the Eastern Districts, I visited the Teng'gar mountains, on which it had been represented to me that some remains of the former worship of Java were still to be found, and accident threw me on the shores of Bali, while attempting to reach Banyuwangi; the simplicity of the people who inhabit the Teng'gar mountains, and the fact of such remains being still in existence on Java, is entitled to record, and, I am aware that whatever information I may be able to communicate respecting Bali, however imperfect, will be accepted.

To the eastward of Surabaia and on the range of hills connected with Gunung Dasar, and laying partly in the District of Pasuruan and partly in that of Probolingo, known by the name of the Teng'gar mountains, we find the remnant of a people still following the Hindu worship, who merit attention not only on account of their being the depositaries of the last trace of that worship discovered at this day on Java, but as exhibiting a peculiar singularity and simplicity of character.

These people occupy about 40 villages scattered along this range of hills in the Neighbourhood of the Sandy Sea, and are partly under Pasaruan and partly under Probolingo. The site of the villages, as well as the construction of the houses is peculiar, and differs entirely from what is elsewhere observed on Java. They are not shaded by trees, but built on spacious open terraces, rising one above the other, each

house occupying a terrace, and being in length from thirty to seventy, and even eighty feet. The door invariably in one corner at the opposite end of the building, to that in which the fire-place is built. The building appears to be first constructed with the ordinary roof, but along the front is an enclosed veranda or gallery of about 8 feet broad with a less inclined pitch in the roof, formed of bamboos which are so placed as to slide out either for the admission of air, or to afford a channel for the smoke to escape, there being otherwise no aperture except a small opening of about a foot square, at one end of the building above the fire-place;—this is built of brick, and is so highly venerated that it is considered a sacrilege for any stranger to pollute it by the touch—across the upper part of the building, rafters are run across so as to form a kind of attic story, in which they dedeposit their valuables and instruments of husbandry.

The head of the village takes the title of *Petingi*, as in the low lands, and he is generally assisted by a *Kabayan* both elected by the people from their own village—there are four Prieste, who are here termed *Dukun*, having charge of the sacred records.

These *Dukuns*, who are in general intelligent men, have no tradition when they were first established en these hills, from whence they came, or who intrusted them with the sacred books to the faith contained in which they still adhere—these they concur in stating were handed down to them by their fathers, their office being hereditary, and the sole duty required of them being to perform the puja according

thereto, and again to hand them down in safety to their children---these records consist of three compositions written on the *Lontar* leaf, describing rhe origin of the world, the attributes of the Deity, and the forms of worship to be observed on different occasions. Copies were taken on the spot, and as the language does not essentially differ from the ordiaty Javanese, I hope at an early period to place the Society in possession of tranlations

In the mean time some notices of their customs, and of the ceremonies performed at Births, Marriages and Funerals, may be interesting.

When a woman is delivered of her first child the *Dukun* takes a leaf of the *Alang Alang* grass, and scraping the skin of the hands of the child and of the mother, as well as the ground, pronounces a short benediction.

When a Marriage is agreed upon, the Bride and Bridegroom being brought before the *Dukun* within the house, in the first place, bow with respect towards the South—then to the fire-place—then to the Earth, and lastly, on looking up to the upper story of the house where the implements of husbandry are placed, perform the same ceremony—the parties then submissively bowing to the *Dukun*, he repeats a prayer commencing with the words, "*Hong! Gendogo Bromo ang'gas siwong'go nomo siwoho sany yang g'ni siro kang*,"&c."* while the Bride washes the feet of the Bridegroom. This ceremony over, the friends and family of

* These prayers wil be found at length in the Transactions of the Society—the word *Hong*, used by the Javanese at the commencement of their invocations to the Deity, is doubtless the Mystical *Om* of the Hindus.

the parties make presents to each of Crises, Buffaloes, implements of husbandry, &c. in return for which the Bride and Bridegroom respectfully present them with Betel leaf

At the marriage feast which ensues, the *Dukun* repeats two *Puja*, which will be found in the collection—the marriage is not, however, consummated till the fifth day after the above ceremony—which delay is termed by them *undang mantu*—a similar delay is, in some cases, still observed by the Javanese in other parts of the Island, under the term *undoh mantu*.

On the death of an inhabitant of Teng'gar, the corpse is lowered into the grave, the head being placed to the South (contrary to the direction observed by the Mahometans,) and bamboos and planks are placed over, so as to prevent the earth from touching it. When the grave is closed, two posts are planted over the body, one perpendicular from the breast, the other from the lower part of the belly; between these two a hollowed bamboo is inserted in the ground, into which, during seven successive days, they daily pour a vessel of pure water, placing beside the bamboo, two dishes also daily replenished with eatables. At the expiration of the seventh day, the feast of the dead is announced, and the relations and friends of the deceased assemble to be present at the ceremony and partake of the entertainment—which is conducted as follows.

An image of leaves ornamented with variegated flowers, made to represent the human form, and of about a cubit high, is prepared and placed in a conspicuous place, and supported

round the body by the clothes of the deceased; the *Dukun* then places in front of the garland an incense pot with burning ashes, and a vessel containing water, and repeats the two *puja* to fire and water, the former commencing with "*Hong Kendogo Bromo gangsi wong'goyo nomo siwoho*" &c. the latter with "*Hong, hong go g'go moho terto roto mejel saking hati,*" &c. burning *Dupu* or incense at stated periods during the former, and occasionally sprinkling the water over the feast during the repetition of the latter.

The clothes of the deceased are then divided among the relatives and friends, and the garland burned—another *puja* commencing, "*Hong! swigno mastu nomo si am, hong! araning,*" &c. is then repeated while the remains of the sacred water is sprinkled over the feast, after which the parties sit down to the enjoyment of it, invoking a blessing from the Almighty on themselves, their houses and their lands. Nothing more occurs until the expiration of a thousand days, when, if the memory of the deceased is beloved and cherished, the ceremony and feast is repeated—otherwise no further notice is taken.

On questioning them regarding the tenets of their religion, they replied that they believed in a *Dewa*, who was all-powerful, and that the term by which the *Dewa* was designated, was *Bumi Truko Sangyang Dewoto Bator;* that the particulars of their worship were contained in the book called *Panglawa*, which they presented to me.

On being questioned regarding the *adat* against adultery, theft and other crimes, their reply was unanimous and ready—that crimes of

the kind were unknown to them, and that consequently no punishment was fixed either by law or custom—that if a man did wrong, the head of the village chid him for it, the reproach of which was always sufficient punishment for a man of Teng'gar—this account of their moral character, is fully confirmed by the Regents of the Districts under whose authority they are placed, and also by the Residents—they literally seem to almost without crime—they are universally peaceable, interfere with no one, neither quarrel among themselves—it may be unnecessary to observe that they are unacquainted with the vices of gaming and Opium smoking.

The aggregate population amounts to about twelve hundred souls; they occupy, without exception, the most beautifully rich and romantic spots on Java; the thermometer is frequently as low as 4-; the summits and slopes of the hills are covered with Alpine firs, and the vegetation common to a European climate generally prevails.

The language does not differ much from the Javanese of the present day, though more gutturally pronounced—from a comparison of about a hundred words of the vernacular Javanese, two only differed; they do not intermarry or mix with the people of the low lands, priding themselves on their independence and purity in this respect.

Passing from this last vestige of the Hindu worship now acknowledged on Java, (for the *Bedui*, though descendants of the fugitives of Pajajaran, scarcely merit notice in this respect,) I proceed to notice some of the leading observations which I made on Bali. The notices

regarding the prevalence of Hinduism on Bali, and of the nature of the Government and country have hitherto been so scanty, that on such interesting ground I may be pardoned for entering into some detail, without which it is impossible to convey a just notion of the subject.

The Island of Bali is at present divided under seven separate authorities, each independent of the other, and of this Heptarchy the state of *Klongk ng* is acknowledged to be the most ancient, its Princes tracing their descent from the Princes of Java, and having once possessed authority over the whole Island.—In the Regalia of this state are reported to be still preserved the Cris of *Majapahit*, the celebrated Gong named *Bentur Kadaton*, and although the other Governments do not at the present day admit of any interference on the part of this state, they still evince a marked respect and courtesy to this family as the *Asal Rajah Bali*, the stock from which they sprung

The population is roughly estimated by the number of male inhabitants whose teeth have been filed, and whose services each Prince can command—these amount to upwards of 200,000; the female population is understood rather to exceed the male, and as it may be considered that only the active and able bodied men are included in the above list, an average of four to a family may be fairly taken, giving a total population for the whole Island exceeding 800,000 souls.

The mode of Government, institutions and prevailing habits, are represented to be the same throughout the Island, and the following sketch of *B'liling* may afford a just notion of the whole.

The Government is despotic, and vested in the Prince alone—he is assisted by a head *Perbakal* in all affairs relating to the internal administration of the country, under whom are immediately placed the heads of villages, and by a *Radin Tumung'gung*, who conducts the details of a more general nature, of commerce and foreign intercourse; the constitution of each village is the same, the head or chief is termed *Perbakal*, and the assistant *Kalian Tempek*. These officers are invariably selected from among the people of the village; the son, however, generally succeeding the father, if competent to perfrom the duties;—under the head *Perbakal*, who has the designation of *Perbakal Rajah*, are several inferior *Perbakals* for general duties and communications with the villages, and under the *Radin Tumun'gung* a similar establisment, bearing the rank and designation of *Kalian Tempek*—among the heads of villages are many whose families have formerly distinguished themselves in the wars of Bali, and who are termed *Gusti*—the command of the military is at present vested in a chief of the *Bramana* cast, and who seems to receive honours and respect next to the Prince himself.

Whatever may at former periods have been the extent and influence of the Hindu religion, Bali is now the only Island in the Eastern Seas, in which that religion is still prevailing as the national and established religion of the country; that high spirit of enterprize which burst the bounds of the extensive confines of India, like the dove from the ark, rested its weary wing for a while on Java, till driven from thence it sought a refuge in Bali, where even among the

rudest and most untutored of savages, it found an asylum. The four grand divisions of the Hindus are here acknowledged, and the number of *Bramana* (Bramins) attached to the small state of *B'liling* exceeds four hundred, of whom about one hundred are termed *Pandita*.

Without entering into the particular tenets of the prevailing Hinduism of Bali, which can only be treated of with propriety and correctness after a more thorough acquaintance with the practical duties, and some knowledge of what is contained in their sacred records, it may be affirmed without hazard, that Hinduism as it exists at the present day on Bali, is rather to be considered as the nationalized Hinduism of Bali, in which a large portion of the native institutions and customs are admitted, than Hinduism as it is understood to prevail on the continent of India—the Bramins are, however, held in high veneration, and on being questioned as to their doctrines and to what sect they belong, they answer invariably, they are *Bramana Siwa*. They have the same appearance as Bramins wherever they are met with, and the Indian features at once distinguish them as descended from a foreign race—the Town and small Temples which we occasionally observed, have the appearance of a Mahratta village, and the eye is struck with every thing strictly Hindu, forming a most unexpected contrast with the present style of building and appearance of the country on passing through Java and the other Eastern Islands.

On enquiring into the relative rank and importance of their deities, they invariably described *Bitara Guru* as the first in rank, then:

Bitara Brama, the spirit of fire, *Bitara Wisnu*, the spirit of the waters, *Bitara Siwa*, the spirit of the winds.

Besides these they describe numerous subordinate deities to whom they pay adoration, as *Dewa Gid'e Segara*, the divinity of the great sea—*Dewa Gid'e Dalam*, the divinity who presides over death—*Gid'e Bali Agung*, the great and popular deity of Bali—*Dewa Gid'e Gunung Agung*, the great deity of the mountain, which last is the deity of most general worship.

Bitara Guru, though considered as the highest object of worship, is declared to be subordinate to, and only the mediator with the divinity, whom they designate by the expressive and appropriate term of *Sang Yang Tunggal*, THE GREAT AND ONLY ONE.

The bodies of the deceased are invariably burnt, and the wives and concubines of the higher classes perform the sacrifice of *Satia*. A few days previous to my landing on Bali, nineteen young women, the wives and concubines of the younger Rajah, who was lately put to death, sacrificed themselves in this manner.

The written language of Bali differs but little from that of Java, but the character has a more ancient form; Kawi is the sacred language, and understood or pretended to be understood by the Bramins—the common language is a mixture of the original language of the country and that of Java, in which the latter predominates.

Deferring until another occasion a more particular review of the religion, institutions and habits of this people, I will for the present confine myself to such observations as occur on

the contemplation of the peculiar and extraordinary charactar they present, for the Balinese differs widely both in appearance and character from the Javan, and indeed from every other nation of the Archipelago.

The natives of Bali are about the middle size of Asiatics, larger and more athletic than the Javans or Malays, and carry an air of independence different altogether from the appearance of their more polished neighbours on the opposite coast of Java—the women in particular are well proportioned, they seem to be on a perfect equality with the men, they are not secluded from society, and their general intercourse with strangers, even Europeans, is frank and cheerful—they are fairer than the women in Java, and wearing no covering above the waist, the natural beauty and symmetry of their shape is neither restrained nor concealed.

There are two kinds of slavery existing at Bali, and sanctioned by the laws of the country; the first is termed *Paniak*, by which is understood a perfect state of Salavery: the second *Rowan*, which resembles the condition of the Slave Debtor in Sumatra and the Malay Peninsula.—*Paniak* is synonimous with *Hamba* among the Malays and signifies a slave—the master has complete possession of his person, and may lawfully transfer and punish with death according to his will and pleasure, it being contrary to usage for the Prince to interfere—In the mode of acquiring this absolute property there appears to be but little restriction—Prisoners taken in war, or famillies carried off from their countries are daily sold and transferred, the deed of transfer, called in Bali *Papol*, being

authenticated by the Tumunggung.—In cases where an outrage occurs in a neighbouring state in alliance, application from the injured party, transmitted through the proper Chief will cause the persons to be restored, and the perpetrators of the outrage are liable to the punishment of death; but in cases where the countries are not immediately in alliance, or when the parties carried off from a friendly state happen to want friends to make application in their favor, no notice is taken of such occurrences—If a free man wishes to marry a female slave, he may obtain her by purchase, provided he can agree with the proprietor, otherwise he may be admitted to marry her on condition that he becomes a servant with her—this second degree of slavery comes under the title of *Rowang*—Persons convicted of offences not of the first magnitude, are generally sold for slaves by the Prince, or taken to serve him as such—The term *Rowang* is used to express the second or modified degree of slavery—If a man happens to be indebted, and without the means of payment (the debt exceeding ten dollars) he may be sold by the Jaxa, and the amount for which he is disposed of is appropriated to repay his creditor, the surplus being divided between the Prince, the Jaxa and the Creditor, as a recompence for their trouble; the man sold in this manner becomes a *Rowang*; this state of servitude embrace every feature of slavery excepting that the *Rowang* cannot be sold, put to death, or sent out of the country—if a *Rowang* wishes to marry, he may do so on receiving his master's consent, but the woman becomes a *Rowang* also. But the *Rowang* pos-

sesses this advantage, that he may redeem himself at any time by Paying the amount of the debt, or the money may be advanced for him, so that his condition becomes that of a debtor bound to serve his creditor until the amount of his debt is discharged—In the event of the debt not amounting to 10 dollars the party cannot be sold, but the Jaxa will order the goods and property of the debtor to be disposed of, and obligation to be given for the payment of the remainder whenever his circumstances may admit. A person indebted to another and unable to pay may make over his wife and children to the creditor, who in such case will become *Rowang*, and on payment of his debt eventually he may demand back his family.

In marriage the dowry established by custom for all persons of equal rank is forty dollars, to be paid to the parents of the bride*—but as it happens in many cases, that the husband is unable to pay this sum, he becomes indebted to the parents for the amount, and this constitutes a third branch of slavery under the term *Tatung'gon*—the man and wife reside in the house of the bride's father, and the man performs service in attendance on the family, or in assisting in the cultivation of the land—when the husband is enabled to pay the dowry, he is then at liberty to quit the father's house and to maintain an independent establishment, under the term of *Orang Merdika*, or free man.—If the new married man, however, behaves to the satisfaction of his

* In Bali as well as on Java, the term used for this payment signifies a purchase.

wife's family, it often happens that after a certain time the father-in-law consents to remit the whole or part the dowry according to the circumstances of the parties.

The punishments for crimes are death, confinement, and selling into slavery—neither torture to obtain confession, mutilation, nor even corporal punishment are used—theft and robbery are punished with death—and for murder treason, and gang robbery in aggravated cases the punishment of death is inflicted by breaking the limbs with a hatchet—this, though it assimilates to the manner of breaking on the wheel, does not appear to have been adopted from Europeans, the practice being of ancient date—the party is left to linger, sometimes for several days before death ensues—all executions are in public—other capital punishments are usually performed with a Cris—open robbery by daylight is punished by death, but stealing, by confinement only; robbery by night invariably by death. All offences are punished in the Jaxa's Court, which consists of two Jaxas and two *Kancha* or Registers, the Perbakal being the prosecutor—the sentence of the Court must be confirmed by the Prince, previous to execution, whose warrant, or *Lontar*, is necessary in all cases. In civil cases the confirmation of the Prince is only required when persons are sold into slavery—a regular table of fees, in civil as well as criminal cases is exhibited in Court, and the amount divided between the members and the Prince.—In criminal cases, when the punishment is capital, the property is confiscated and divided in like manner, but in other punishments, the parties retain their

property. Adultery is punished with death to the man, and the woman becomes a slave to the Prince—theft is the most prevalent crime, and adultery is uncommon, perhaps not twenty cases in a year—the husband has the power by law to kill both parties at the moment, if he detects them in the fact. but not otherwise.

In their domestic relations, however, the conduct of the Balinese appears unexceptionable, and there is indeed a superior delicacy to what might be expected, and the tenderness towards early age speaks strongly in favor of their natural disposition. The parental authority is exercised with such tenderness, that it is peculiarly striking when taken in the same view with the apparently rude character of the people—they seem to evince a careless indifference to the rod of despotism which hangs over their head, and an air of good humour and general satisfaction prevails throughout; temperate in their diet, and strangers to drunkenness, the ruling passion is gaming, from cockfighting to an inordinate and unprincipled desire for conquest—such is the energy of the character that it must find some powerful vent, something on which to discharge itself—and not being subjected to a form of Government, calculated to repress their energies, they evidently feel no inclimation to stand still in the scale of civilization—As a nation they are certainly invincible to any Native power in the Eastern Seas; still maintaining a high and noble independence of character. they perhaps exhibit in a concentrated spot as much of human nature, checked by regulation, and yet not lowered or refined by it as is to be found in any part of the universe.

If we contemplate the various nations and tribes which inhabit the Southern Peninsula of India, and the innumerable Islands composing that portion of the Globe comprehended within Polynesia and Austral Asia, our attention is arrested by the striking uniformity in habits and language which prevails throughout, inducing the inference either of one common origin or of early and very general intercourse.

Such customs as the singular practice of filing the teeth and dying them black, noticed by the Authors who have written on Pegu Siam Camboja and Tonquin, and prevailing generally throughout the whole Malayan Archipelago; the practice of distending the perforated lobe of the ear to an enormous size, noticed in like manner to exist in the same parts of the Peninsula, and prevailing throughout the Archipelago in a greater or less degree in proportion with the extension of Islamism; the practice of tattoonig the body, noticed among the Burmans and people of Laos, common to many tribes on Borneo, and particularly distinguished in some of the Islands in the Pacific Ocean; if it is observed that this custom, as well as that of plucking the beard, was noticed in South America, the question may arise in what course or direction the tide of population may have flowed— In a recent publication an idea has been started, on the similarity of the languages, that the population of the Phillippines and of the Islands in the South Sea originally emigrated from America.* It will not be required of me to go into any

* This author notices that observing the proper names of places about the middle of the continent of South Ame-

description of those singular appendages to the virile Member, noticed by the writers on Pegu, Siam and Camboja, and adopted among many tribes of Borneo and the Moluccas—whatever may have been the origin of this very singular custom, traces are to be found even on Java of the veneration in which it once

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rica, were very similar to those of the Philippines, he endeavored to procure a Vocabulary of the country, and to examine the few words of the language of Chili, which Ercilla mentions in his Araucana, and found them perfectly conformable to the language of Tagala.—„ In examining the structure of the two languages," he observes, „ we are compelled to conclude that they flow from one and the same source, and I dare to affirm that the Indians of the Phillippines are descended from the aborigines of Chili and Peru, and that the language of these Islands derives immediate from the parent source, those of the neighboring islands being dialects of this—that there ary many reasons and one in particular, for supposing that the Islands in the South Sea could not be peopled from the westward; viz. that in all the torrid zone the east wind generally prevails, which being in direct opposition to the course from Malacca and the adjacent Islands, it is fair to conclude the inhabitants of all the islands in the South Sea came from the east, sailing *before the wind*; for we have seen it often happen, that the Indians from the Palaos have arrived at the Phillippines precisely under these circumstances. On the contrary we have no instance on record of any of the Phillippine Indians having been, even by accident, carried by the winds to the islands to the eastward."

„ Here, therefore," he concludes, „ we appear to have formed the most probable solution of our difficulties, that is, that the first settlers came out of the east, we may presume from the coast of South America, and proceeding gradually to the westward through the Pacific Ocean, studded as we find it with Islands and clusters of Islands, at no very great distance from each other, and of course of easy access before the wind; it follows that to whatever point in an eastern direction, we trace the Tagalic Language, we may conclude that at that point emigration must have commenced."—Description of the Phillipine Islands, by Martinez de Tuniga—Marsden Trans page 30.

was held.—The practice of triumphing over a subdued enemy may be common to the barbarous state in general, but the deliberate system of *Man-hunting*, in order to procure heads as a trophy of manliness and Military gallantry, however it may have originated in this feeling of uncivilized nature, may be ranked among the peculiarities of this portion of the Globe.

The language of the different tribes of Borneo is ascertained to bear a strong resemblance to that of the scattered tribes of Camboja, Champa and Laos—the position maintained by Mr. *Marsden*, that the Malayan is a branch or dialect of the widely extended language prevailing trough the Islands of the Archipelago, to which it gives name, as well as those of the South Sea, appears to be established and confirmed as our information advances, and if we except the Papuas and scattered tribes having curled hair, we find the general description given of the persons of the Siamese and the ruder population of the adjacent countries which have not admitted any considerable admixture from the Chinese, to come very near to the inhabitants of the Archipelago, who may in fact be said to differ only in being of a smaller size, and in as far as foreign colonization and intercourse may have changed them.

To trace the sources from whence this colonization and consequent civilization flowed, and the periods at which it was introduced into different states, is a subject new to the historian, and not uninteresting to the Philosopher.

If we admit the natural inference that the population of the Islands originally emigrated from the continent, and at the same time the

probability that the country lying between Siam and China, is the immediate source from whence such emigration originally proceeded, the history of the eastern Islands may, with reference to that of Java in particular, in which a powerful Hindu Government was without doubt early established, be divided into five distinct periods.

The first division would include the period commencing with the earliest accounts of the population down to the first establishment of a foreign colony in Java of which the written annals of the country make mention; the date of this is pretty accurately ascertained, and may be fixed at about the commencement of the sixth century of the Javanese Era, or A. D. 600, when only the period of authentic history can be considered to commence.

The origin of all nations is buried in obscurity, and unless we may succeed in obtaining new lights from Siam or China, we shall have but little to guide us during the early part of this division, beyond conjecture and such general inferences as may be drawn from a similarity in person, language and usages, still found to prevail among the less civilized tribes. According to the division of Sir *William Jones*, the original population of the Islands were doubtless of the Tartar race, and probably from the same stock as the Siamese. The Javans date the commencement of their Era from the arrival on Java of *Adi Saka*, the minister of *Prabu Joyo Boyo*, sovereign of *Hastina*, and the fifth in descent from *Arjuno* the favorite of *Krisna* and the leading hero of the B'rata Yud'ha. This epoch corresponds with that of the introduction of a new faith into China and the further

peninsula by *Saka*, *Shaka* or *Sakia*, as he is differently termed, and with the Chronology of the Hindus, as explained by Sir *William Jones*, in which *Saca* is supposed to have reigned seventy nine years subsequent to the commencement of the Christian Era; but whether *Saka* himself or only some of his followers assuming this name found their way to Java may be questionable, and it is not impossible that the Javanese may have subsequently adopted the Era, on a more extended intercourse with the further peninsula.* A connection would at any rate appear to have existed between Java and Siam, as this Adi *Saka* is not only represented to have founded the present Era of Java, but to have introduced the original letters of the Javanese Alphabet, by a modification of the letters used in Western India and in Siam. It does not appear that either he or his followers established themselves in any authority, and we can trace but little with certainty during the following five centuries—some of the Javanese accounts refer to the arrival of various settlers during this period, but we find no traces either of a Government having existed or of the establishment of any extensive colony, until the commencement of the sixth century. I should observe in this place that the Javanese year corresponds pretty nearly with the Hindu year of Salivarna, and that the word *Seka* in Sanscrit means an epoch or era, and is applied to the founder of an era.

* The present Javanese year is 1742.
That of Bali .... 1733.

The Javanese occasionally use the numerals for recording dates. but more generally and particul rly in dates of importance, they adopt an hieroglyphical invention termed *Chondro Sangkolo* in which the different numerals from one to ten are represented by particular objects—this is either effected in buildings and sculpture by the actual representations of these objects, or in writing by the insertion of their names, the meaning frequently having some allusion to the fact which the date records, thus the date of the destruction of Majapahit in the Javanese year 1400, is recorded as follows, the order of the numerals being reversed—

Sirna ilang Kertaning—Burni
Gone—gone—is the work—of the land
0 0 4 1

Anterior to this supposed arrival of *Adi Saka*, the two most eventful periods in the history of these countries of which tradition and history make mention, are—first, that which includes the executions of the far famed Race, who have been supposed to have peopled South America,* and according to Sir *William Jones*, „ imported into the furthest parts of Asia, the rites and fabulous History of Rama" and secondly, that which includes the consequences of the invasion of India by Alexander the Great—that the fabulous History of Rama as well as the exploits of Alexander have been current in the Malayan Archipelago from time immemorial, cannot be

* See a former Note on the similarity between the languages of South America and the Phillippines, and the recent works of Humbold:, on the existence of Hindu remains still found in America, in support of this assertion.

questioned; and it may be remarked that while the Javans use the term *Rama* for father, the Malays universally attempt to trace their descent from Alexanden or his followers.—Sumatra was long considered to have been the *Taprobáne* of the ancients, and when we advert to the single circumstance that this was said to be a country in which the North Polar Star was not visible, or only partially, we must still doubt the correctness of the modern conclusion in favor of Ceylon—The Eastern Islands furnish that peculiar kind of produce which has from the earliest times been in demand by continental nations, and the same avidity with which in modern days Europeans contende for the rich products of the Moluccas. in all probability actuated, at a much earlier period, adventurers from Western India. Traces of intercourse with Ethiopia may be found at this day in the scattered tribes of the woolly haired race peculiar to Africa, which are to be found on the Andamans, on the Southern part of the further peninsula and throughout the Archipelago, and that the Hindus were at one period an enterprising and commercial nation may I think be established with little difficulty from the incontestible proofs which at this day exist on Java, and the traffic which still exists in native vessels and on native capital between the Coromandel coast and the Malayan peninsula. If any country therefore in the Archipelago lays claim to this distinction more than another it is Java--but probaly it was rather to the Eastern Islands generally than to one Island in particular that the appellation was given--both Ptolemy and the Arabians would seem to have designated the Islands by

one general name—by the one they were termed *Jabadios Insulæ*, by the others *Jaü* or *Jawa*, hence probably the confusion in the travels of *Marco Polo*, and the still disputed question between *Java Major* and *Java Minor*.*

The second division would include the period between this first regular establishment from Western India, and the decline and fall of the first Eastern Empire on Java, which may be fixed with tolerable accuracy at about the Javanese year 1000, or A. D. 1073.

During this period, by far the most eventful in the history of Java, we shall find colonies of foreigners establishing themselves not only on Java, but on various other Islands of the Archipelago—that the arts, particularly those of Architecture and sculpture, flourished in a superior degree, and that the language, literature and institutions of the continent of India were transfused in various directions through the oriental Islands—it was during this period that the principal temples, of which the ruins now exist on Java, were built, and besides the concurring testimonies of tradition and the writ-

* If we reflect upon the extent and nature of the recent Volcanic phenomena on Sumbawa, and the effects which may have been produced by similar convulsions of nature, we are led to conclude that the present appearence and form of the Archiphelago may be very different from what they were two or three thousand years ago—at that period these Islands may have formed part of the main land, or have been themselves united in one continent. An authentic account of this extraordinary phenomenon as far as it can be collected from information yet received is submitted to the Society, and will be found in the subsequent pages of its transactions. I can vouch for the correctness of the statements, and the raw materials may be found useful in the hand of the natural historian.

ten compositions of the country, the numerous inscriptions and dates on stone and copper, the characters of which we are now able to decypher, as well as the ancient coins, would lend essential aid in establishing a correct chronology—on the one hand we should have to direct our enquiries to the history of the various continental nations from whence these foreigners might have proceeded, and on the other to the nature and extent of the establishments, intercourse, and civilization introduced by them into the different Islands.

This period will commence from the arrival of *Awap*, the reputed son of *Balia Atcha*, sovereign of Kundjirât, who come in search of a celebrated country described in the writings of *Saka*, and under the name of *Sewelo Cholo*, established the first regular monarchy of which the Javanese annals make mention—and include the adventures of the celebrated *Panji*, the pride and admiration of succeeding ages—our attention would also be directed in a particular manner to the intercourse between Java and the other Islands, and the nature and extent of the foreign establishments formed by Java. Tradition and the popular romances of the country represent not only kingdoms of Goa and Luhu on Celebes, but even the kingdom of Menangkabaú on Sumatra to have been established about the conclusion of this period by Princes from Java,

The third division would include the period from the above date till the final overthrow of the second Eastern Empire, in the Javanese year 1400 Some idea may be formed of the power and opulence of this second Empire established

at Majapahit, from the extensive ruins of that city still extant—these I took an opportunity of visiting during my late tour, and I believe I am within the mark when I represent the walls to have enclosen a space of upwards of twenty miles in circumference.

Within this period will be included the establishment of the Western Empire at Pajajaran, the subsequent division of the Island under the Princes of Majapahit, and Pajajaran, the eventual supremacy of Majapahit, and the final overthrow of the Government and ancient insritutions of the country by the general establishment of the Mahometan faith.

It was during this period that Java may be said to have risen to the highest pitch of her civilization yet known, and to have commanded a more extensive intercourse throughout the Archipelago, than at any former period. Colonies from Java were successively planted on Sumatra, the Malayan Peninsula, Borneo and Bali, the Princes of which countries still trace their descent from the house of Majapahit; and that adventurers from Western India, from Siam, from Champa, from China and from Japan, frequented Java in the greatest number; but the object of first importance will be to trace the introduction, progress and final establishment of the Mahometan faith in the various countries where it now is acknowledged as the established religion, and particularly on Java, where we find that notwithstanding attempts to make proselytes were made as early as the commencement of the twelfth century, such was the attachment of the people to their ancient

faith and institutions, that they did not effectually succeed till the latter end of the fifteenth of the Christian Era.

The fourth division would commence with the establishment of the Mahometan Government on Java, and might be brought down to the establishment of the Dutch in the Eastern Seas—say A. D. 1600, and a fifth, and by no no means uninteresting period, might include the history of the European establishments down to the conquests by the British arms in 1811.

The further prosecution of this extensive enquiry would lead me beyond the limits at present prescribed, and I must therefore conclude with drawing your attention to the striking similarity between the early state of Greece, and that of the Malayan Islands; change but the names, and the words of Mitford's introduction to his history of Greece will be found equally applicable to this more extensive Archipelago.

"Thus "he observes," Greece in its early days was in a state of perpetual marauding and piratical warfare; cattle, as the great means of subsistence, were first the great object of plunder, then as the inhabitants of some parts by degrees settled to agriculture, men women and children were sought for as slaves—but Greece had nothing more peculiar than it's adjacent sea, where small Islands were so thickly scattered, that their inhabitants, and in some measure those of the shores of the surrounding continents also, were mariners by necessity—water expeditions therefore were soon found most commodious for carrying off spoil; the Greeks moreover, in their more barbarous state, became

acquainted with the precious metals, for Phoenicians, whose industry, ingenuity and adventurous spirit of commerce led them early to explore the further shores of the Mediterranean, and even to risk the dangers of the ocean beyond, discovered mines of Gold and Silver in some of the Islands of the Ægean, and on its Northern Coast they formed Establishments in several of the Islands; and Thasus, which lay convenient for communication with the most productive mines, became the seat of their principal factory—thus was offered the most powerful incentive to piracy, in a sea whose innumerable Islands and ports afforded singular opportunity for the practice—perhaps the conduct of the Phœnicians towards the uncivilized nations among whom the desire of gain led them, was not always the most upright or humane; hostilities would naturally ensue, and hence might first arise the estimation of piracy which long prevailed among the Greeks as an honorable practice."

Java has long been advanced beyond that state in which piracy and robbery are held to be honorable in the eyes of men, but the picture will be found pretty correct of those Islands strictly denominated Malayan.

The superior and extraordinary fertility of the soil may serve to account for the extensive population of Java compared with that of the other Islands, and when to the peacable and domestic habits of an agricultural life, are added the facilities for invasion along an extensive line of coast, accessible in every direction, it will not be surprizing that she should have fallen an easy prey to the first invader—she ap-

pears to have lost by these invasions much of that martial spirit and adventurous enterprize which distinguishes the population of the other isles, but at the same time to have retained not only the primitive simplicity of her own peculiar usages, but all the virtues and advantages of the more enlightened institutions which have been introduced at different periods from a foreign source—at all events when we consider that her population cannot be less than four millions, and when we witness the character, and literature of the people as it is even now exhibited, we must admit that Java had attained a far higher degree of civilization than any other nation in the Southern Hemisphere.

You will, however, expect from me some notice regarding Japan—"that celebrated and imperial Island," which, to use the words of Sir *William Jones*, bears "a preeminence among Eastern Kingdoms, analogous to that of Britain among the nations of the West," and however slender may have been the information procured, such as it is, I venture to submit it to you, nearly as I recived it from the verbal communications of Dr. *Ainslie*.

It may be satisfactory and gratifying in the first place to observe, that every information which has been obtained, tends to confirm the accuracy, the ability and the impartiality of Kæmpfer, whose account of Japan is perhaps one of the best books of the kind that ever was written, considering the circumstances under which he was sent.—I am assured that there is not a misrepresentation throughout; he was a man of that minute accuracy and that habitude of

talent which saw every thing as it stood, and not through the mist or medium of any preconception—the Japanese observe of him, that he is in History "the very apostle of their faith," and from whose works alone they know even their own country—their first enquiry was for a copy of Kæmpfer—and, endeavouring to evince the estimaton in which this author was held by them, their observation was literally that "he had drawn out their heart from them and laid it palpitating before us, with all the movements of their Goverment, and the actions of their men."

Referring you, therefore, to the works of Kæmpfer for an account of their history, institutions, and acquirements, as genuine data on which this interesting people may be appreciated, I need only offer a few notices on the character which they appeared to Dr. *Ainslie* to display during a residence of four months, and as far as he had the opportunity of judging.

They are represented to be a nervous, vigorous people, whose bodily and mental powers assimilate much nearer to those of Europe than what is attributed to Asiatics in general; their features are masculine and perfectly European, with the exception of the small lengthened Tartar eye, which almost universally prevails, and is the only feature of resemblance between them and the Chinese—the complexion is perfectly fair and indeed blooming, the women of the higher classes being equally fair with Europeans, and having the bloom of health more generally prevalent among them than usually found in Europe.

For a people who have had very few if any external aids, the Japanese cannot but rank high in the scale of civilization; the traits of a vigorous mind are displayed in the sciences, and particularly in metaphysics and judicial astrology--the arts speak for themselves, and are deservedly acknowledged to be in a much higher degree of perfection than among the Chinese, which whom they are by Europeans so frequently confounded; the latter have been stationary at least as long as we have known them, but the slightest impulse seems sufficient to give a determination to the Japanese character, which would progressively improve until it attained the same height of civilization with the European—nothing indeed is so offensive to the feelings of a Japanese as to be compared in any one respect with the Chinese, and the only occasion on which Dr. *Ainslie* saw the habitual politeness of a Japanese ever surprized into a burst of passion, was upon a similitude of the two nations being unguardedly made, when he laid his hand on his sword.

The people are said to have a strong inclination to foreign intercourse notwithstanding the political institutions to the contrary, and perhaps the energy which characterises the Japanese character cannot be better elucidate than in that extraordinary decision which excluded the world from their shores, and confined themselves within their own limits—a people who had before served as mercenaries throughout all Polynesia, and who traded with all nations—themselves adventurous navigators.

There is by no means that uniformity among them which is observed in China, where the im-

pression of the Government may be said to have broken down all individuality and left one Chinese the counterpart of another. Unlike the Chinese, the women here are by no means secluded—they have a society among themselves as the Ladies of Europe. During the residence of Dr. *Ainslie*, frequent invitations and entertainments were given; on these occasions, and at one in particular, a lady from the Court of Jeddo is represented to have done the honors of the table with an ease, elegance, and address that would have graced a Parisian. The usual dress of a Japanese woman of middle rank costs perhaps as much as would supply the wardrobe of an European lady of the same rank for twenty years.

The Japanese, with an apparent coldness like the stillness of the Spanish character, and derived nearly from the same causes, that system of espionage, and that principle of disunion, dictated by the principles of both Governments, are represented to be eager of novelty and warm in their attachments, open to strangers, and bating the restrictions of their political institutions, a people who seem inclined to throw themselves into the hands of any nation of superior intelligence—they have at the same time a great contempt and disregard of every thing below their own standard of morals and habits, as instanced in the case of the Chinese.

This may appear to be contradicted by the mission from Russia in 1814, under Count Kreusenstern, but the circumstances under which that mission was placed should be considered: from the moment of their arrival they were under the influence of an exclusive factory, who continued to rain upon them every possible ignominy

which can be supposed to have flowed from the despotism of Japan, through the medium of an interested and avaricious factor, who dreaded competition or the publication of his secret. The warehouse in which the Russian mission had been lodged was pointed out to Dr. *Ainslie*. who observes that „as the rats ware let out the Count and his suite were let in, where they remained for six long months, with scarce room to turn, the mark of obloquy to the Japanese and the laughing stock to the European Factory." So lively, indeed, was the impression of the occurrence, that the chief Japanese officer asked the English commissioner if he too would condescend to play the part of the Russian count,—the officer answering to his own question, „no, I trust not."

The mistaken idea of their illiberality in religious matters, seems to have been fully proved, and the late mission experienced it in a degree hardly credible and little expected by themselves from the representations previously made to them—the story of the annual test of trampling on the crucifix at Nanggasaki and the other important cities, is a story derided by the Japanese priesthood. On visiting the great temple on the Hills of Nanggasaki the English commissioner was received with marked regard and respect by the venerable patriarch of the Northern provinces, eighty years of age, who entertained him most sumptuously; on shewing him round the courts of the Temple, one of the English Officers present heedlessly exclaimed in surprize *Jasus Christus* — The Patriarch turning half round with a placid smile, bowed significantly, expressive of „ Wo

In the same spirit let us hope that now, when

> "That spell upon the minds of men
> "Breaks, never to unite again"—

no withering policy may blast the fair fruits of that spirit of research which has gone forth from this Hall; nor continue, under any circumstances, to shut out one half of the world from the intelligence which the other half may possess.

UITTREKSELS

Uit eenige aanteekeningen nopens den Javaan in het Oostelijke gedeelte van het Eiland

JAVA,

Door F. VAN BOECKHOLTZ, 1775.

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Onder de verschillende volkeren, die de oostersche Eilanden bewonen, is de Javaansche Natie, voornamelijk in de oostelijke provintien van het eiland Java, ongetwijfeld eene der beste.

Over het algemeen is de Javaan vernuftig en bezit ligchamelijke vermogens genoeg om allen arbeid te verrigten, waaraan hij de grootste lijdzaamheid paart.

Hij is bruiner dan de andere inwoners der voren gemelde Eilanden, en zijn neus en aangezigt zijn spitser, waaruit men moet afleiden, dat hij meer met de kustvolkeren gemengd is dan de inboorlingen van Makasser en verder om de oost gelegen Eilanden, die blanker en vlakker van wezen zijn, en bijna geheel geen' neus hebben.

De bewoners van het eiland Bali komen zeer nabij de Javanen. De overblijfsels van tempels en beelden der Braminen toonen aan, dat zij ook daar, zoo wel als op het eiland Madera langen tijd geweest zijn, waarvan velen der bewoners nog Heidensch zijn, ofschoon zij zelven weinig daarvan meer weten.

De Javanen zijn overigens zeer wel gemaakt, en behoeven daaromtrent voor geene natie in de wereld onder te doen. Zij zijn van eene matige hoogte, en hellen meer naar de grootste dan kleinste volkeren van de oost van Indie, en heb-

ben een taai en sterk ligchaams gestel. Hun glimmend zwart haar dragen zij gewoonlijk zeer lang. De mannen laten onder den neus een gedeelte van den baard tot een kneveltje groeijen, en trekken overigens de verdere haren met eene kleine tang uit, zoo dat zij om den mond geheel kaal zijn. Onder de andere kunne vindt men buitengemeen fraaije menschen. De vrouwen onderscheiden zich door hare welgevormde handen en voeten, en door de bevallige dunheid harer lendenen.

Die genen onder haar, die bij welgezeten inlanders worden opgevoed en meestal binnen huis blijven, zijn redelijk blank, doch de vrouwen van geringere klassen, die meestal in de open lucht de dagelijksche bezigheden verrigten, zijn donker van kleur en grover.

Men ontmoet onder de Javanen weinig kreupelen of misvormde lieden, uitgezonderd echter eenige weinige geheel rare dwergen, zoo als bij voorbeeld de *Kitip*, waarvan de heer *Baron van Wurmb*, in het 3de deel van de Verhandelingen van het Bataviasche Genootschap, eene beschrijving gegeven heeft.

Een ander verschijnsel onder deze trekt echter de aandacht meer naar zich; de witte Javaan, die onder hen *Boele* genaamd wordt. Zij worden uit een zwarten vader en moeder geboren, en men heeft in een huisgezin zes kinderen gezien, waarvan drie zwart en drie wit waren. Zij hebben geheel witte haren en oogen. Bij sommigen vindt men dat de oogen rood zijn, als die van een wit konijn. Bij sterke zonneschijn of helder daglicht zien zij slecht, doch des avonds is hun gezigt beter dan dat van hunne zwarte landgenooten.

De Javanen zijn zeer lijdzaam en weten buitengemeen wel te veinzen, het geen hen bijzonder wel te pas komt onder de verschillende regeringen, waarvan zij zich dikwijls moeten onderwerpen, zoo dat hun karakter zich gemakkelijk buigt en went aan den wil hunner meerderen. Hunne stille en achterhoudende geaardheid, maakt dat men lang met hen moet verkeeren, eer men hen regt kan doorgronden; doch zij zijn in verre na zoo moorddadig niet als de heer *Valentijn* hen opgeeft, ofschoon er velen onder hen gevonden worden, die in de verkrijging van eene geringe som geld, bij voorbeeld van twee of drie rijksdalers, eene genoegzame aanleiding vinden om een ander mans leven te benemen; doch hieromtrent maken zij geene uitzondering op vele beschaafde natien in Europa, waaronder zoodanige verschijnselen van 's menschen verdorvenheid mede niet geheel vreemd zijn. De heer *Valentijn* eenlijk maar een korten tijd in de oostelijke provintien van het Eiland geweest zijnde, bij gelegenheid dat aldaar eenige vijandige bewegingen plaats hadden, en dus in een tijdstip dat het volk in deszelfs gewone wijze van handelen gestoord was, kon derhalve niet wel geacht worden, op billijke gronden, hen zoo ongunstig afgeschetst te hebben.

Onder de eerste klassen, is dit volk van natuur zeer hovaardig en op uiterlijk vertoon gezet, vooral de genen die eenig aanzien hebben en van eene goede geboorte zijn. Niets streelt het hart van zoodanig een' aanzienlijken Javaan meer dan statelijke optogten, en omringd te zijn van eenen talrijken stoet, wanneer hij in het openbaar verschijnt. Ook legt hij daaraan het grootste gedeelte van zijn vermogen ten koste,

alzoo hij, door gebrek aan onderrigting en opvoeding, bijna geene andere grootheid kent.

Het is daarom niet te verwonderen dat zij veel liefhebberij hebben in een aantal sieraden, die zij met alle zorgvuldigheid onderhouden, en in fraaije paarden. Het nut en vermaak, dat deze dieren hun verschaffen, maken dat zelfs de geringe Javaan zich een paard aanschaft, zoodra zijne middelen zulks maar eenigzins gedogen. De Kris en Piek zijn deszelfs geliefkoosde wapentuigen, en dezelven schoon te wrijven en te poetsen, is een werk waaraan zij geheele dagen besteden. Zij zetten deze wapenen met gift aan, die door den langen duur zoodanig daarvan ingevreten worden, dat de daarmede gemaakte wond, hoe gering dezelve ook zij, geacht wordt ongeneesbaar te zijn. Onder de vermogende lieden vindt men ook eenigen, die fraaije Geweren en Pistolen, Sabels en Degens bezitten, doch het schijnt dat zij voor deze Europesche wapenen minder achting betoonen; althans zij worden slecht onderhouden en bederven gewoonlijk zeer spoedig in hunne handen. Eenigen zijn tamelijk wel bedreven in het schieten op de schijf of op eenig stilstaand voorwerp, doch het treffen in de vlugt of loop valt hun bezwaarlijk. Eene genoegzame oefening zou hen echter spoedig hierin den Europeaan doen evenaren, ofschoon de meerdere omslag die het gebruik onzer wapenen verzelt, hun tegenstaat, terwijl zij beweren, dat buiten eene gemakkelijker behandeling, hunne wapentuigen nog het voordeel boven de onzen hebben, dat dezelve ten allen tijde in wind en regen te gebruiken zijn.

De Javaansche vermaken en spelen bepalen zich tot een gering getal. Bij de vorsten en grooten wordt veel werk gemaakt van zekere troepen van danseressen, onder de benamingen van *Bedojo's*, *Tandaks*-meisjes en andere meer. De *Bedojos* worden gekozen uit de fraaiste van hunne bijwijven en zijne op eene bijzondere wijze versierd met goud, juwelen, diamanten en bloemen, en verder met eene soort van geel welriekend smeersel, waarmede zij hare armen, aangezigten en boezem bedekken. Zij dansen dan alzoo, negen in getal, voor den vorst op de muzijk, naar 's lands wijze. Bij andere groote inlanders mogen zij het getal van zeven niet overtreffen. De kunst van dit dansen bestaat in het maken van zeer langzame en kunstmatige bewegingen met armen en beenen, en het gansche ligchaam. Het geheele bedrijf, zoo wel als hare versiersalen, duidt volkomenlijk aan, dat het van de Braminen herkomstig is.

De Tandaksmeiden zijn in denzelfden smaak opgetooid, doch zijn eene minder uitgezochte soort van vrouwen, zoo dat men dezelve van allerlei klassen aantreft, dalende van die van den vorst af tot dezulken, die met hare kunst op de openbare straten en markten de kost verdienen. Deze laatste trekken het land door, en heffen onder het dansen, een schelluidend lied aan, waarin zij de eer der mededansende mannen bezingen, en zich zelve door deze liefkozerij aangenamer bij hen maken.

Zij hebben ook eene soort van schimmen, die zij *Waijang Koelit* noemen en waaraan zij zeer verslaafd zijn. De figuren zijn van leden, in zeer zeldzame gedaanten uitgesneden, en verder geschilderd en naar den eisch verguld. De-

zelve worden achter een fijn doek vertoond, en verbeelden de oude historie, en de veldslagen van reuzen en anderen hunner groote helden.— Hun *Waijang* wordt door levendige personen gespeeld, waartoe wel 50 a 60 spelers noodig zijn. Die van den Sultan van de Mataram is zeer prachtig. Tot het geven van dergelijke spelen zijn echter geene afzonderlijke plaatsen of gebouwen, en dezelve hebben plaats in de huizen zelve der genen die zulke spelen geven willen

Het amfioen rooken is bij den Javaan algemeen Hij is daaraan zoo verslaafd, dat hij zijne meeste vermogens zou verspillen ter verkrijging van dat artikel, zijnde hij in de verbeelding, dat na eene zware vermoeidheid, een pijpje amfioen hun beter doet slapen en rusten.—Zij hebben deze gewoonte overgenomen van de kustvolkeren.

Sterke dranken drinken zij zelden, even zoo weinig als wijn en bier. De Javanen die met of digt bij de Europeanen wonen, maken hierop nog eene geringe uitzondering; doch op de Europesche feesten, zijn zij gewoonlijk niet huiverig om daarvan soms een onmatig gebruik te maken.

De mannen en zelfs vele vrouwen rooken tabak, die op het eiland zelve groeit. De grooten zetten dezelve aan met benjuin en andere reukwerken en kerven dezelve veel fijner dan de Europeanen. Zij hebben geene pijpen, maar rollen de tabak in *Wiroe* bladeren, die van Palembang en Riouw daartoe aangebragt worden.

Alle Javanen, zoo mannen als vrouwen zonder uitzondering, kaauwen *Sierie* bladeren, gemengd met kalk, gambier en tabak, die de

tanden zwart en de lippen rood maken, en voor een' vreemden Europeaan een zeer onsmakelijk voorkomen hebben. Het Sierie blad is echter niet te verwerpen, maar, de kalk, die daarop wordt gesmeerd, bederft de tanden en doet dezelve uitvallen. Dit en het slijpen van de tanden, zijn redenen dat men zeer weinige inlanders met ongeschonden tanden vindt, en dat zij dezelve ook vroeger verliezen.

Buiten de hierbovengenoemde *Piek* en *Kris*, heeft de Javaan nog tot wapenen, de *Boog* en *Pijlen*, de *Bijl* en de *Schild*, die van geheel oude tijden bij hen in gebruik zijn geweest, en ongetwijfeld van de kustvolkeren zijn medegebragt.

Onder dezelven vindt men die zeer kunstig met goud zijn ingelegd, en andere, waaraan men volgens zeggen van den bijgeloovigen Javaan, niet raken kan zonder gevaar van eenig ongeval te krijgen. De Vorsten hebben er eenigen die ruim eene eeuw oud zijn, en die bij de inlanders van groote waarde zijn, wijl dezelve het sterkst zijn vergiftigd. Zij gebruiken ook eene soort van kapmes, *parrang* genaamd, maar die worden door de grooten niet gedragen, dan wanneer zij ten hove verschijnen, moetende in dat geval een ieder van den kroonprins af tot den minsten ambtenaar, zulk een parrang bij de kris op zijde hebben.

De pieken zijn van verschillende lengte, doch de meeste, die zij in den oorlog gebruiken, zijn tot twaalf voeten lang.

Het ontbreekt den Javaan aan geene dapperheid, maar eenlijk aan goede hoofden en aanvoerders. Hij ondergaat den dood met veel

minder angst en schrik dan de Europeanen; maar daar hij geene kunde, noch de noodige oefening bezit om tegen een Europeesch leger te ageren, gevoelt hij eene groote vrees voor de kracht onzer wapenen.

Daar de Javanen den Mahomedaanschen Godsdienst belijden is de veelwijverij onder hen ook in zwang. In tegenstrijdigheid echter met die leer, doet de bijgeloovigheid hem aan steenen, rivieren, beelden en andere diergelijke voorwerpen offeren. Bijna geheel onbekend met het goede van den godsdienst, zijn zij dikwijls ongenegen zich naar betere zeden te schikken. Zij trouwen dus ook wanneer het hun in de gedachten komt, en scheiden weder even gemakkelijk van de vrouw, hetgeen gedurende den leeftijd van een Javaan, onderscheidene keeren plaats vindt, en eene zeer schadelijke uitwerking heeft op zijne maatschappelijke zamenleving. In het stuk der liefde zeer naijverig, wordt hij door die hartstogt dikwijls verblind, en beneemt in koelen bloede, soms op enkele verdenking het leven, zelfs van zijne naaste aanverwanten

Men beschuldigt de Javanen van verregaande trouwloosheid, doch ik kan getuigenis geven, dat die ondeugd onder hen niet in een' hooger graad dan bij eenige andere natie in de wereld heerscht. Even zoo is veel ter verdediging van de hun aangetijgde luiheid bij te brengen. Het warme klimaat, doch voornamelijk de drukkende regering, waaronder zij gebukt gaan, zijn toch geene prikkels tot den arbeid, bij eene natie, die onzeker of zij morgen zal kunnen maaijen, het geen hare naarstigheid heden mogt hebben gezaaid, op niets anders bedacht geworden is, dan ter verkrijging van dat geen wat hare ge-

ringe behoeften dagelijks vorderen. Indien deze ondeugd wezenlijk in het oog valt, zoo is dezelve nog grootendeels onder de grooten of aanzienlijke Javanen te vinden. Men hebbe eenlijk het oog te slaan op de aanmerkelijke hoeveelheid van rijst, padi en andere voortbrengselen, die zoo wel voor eigen benoodigdheid als voor den jaarlijkschen uitvoer, van dit eiland getrokken worden, om te ontwaren, dat de gemeene man niet onledig moet zijn; te meer wijl de Javaan, die maar in eenige bediening geplaatst is, ofschoon de inkomsten daarvan niet meer dan vier a vijf rijksdalers 's jaars mogten bedragen, zich aan den landbouw onttrekt, en met vele duizenden anderen, die de inlandsche vorsten en grooten omringen, zich overgeeft aan eene volslagene ledigheid. Eene andere aanmerkelijke hoeveelheid der geringere ingezetenen wordt gebezigd tot draagvolkeren en het doen van zware heerendiensten, en aan dit gedeelte der bevolking, zoo wel als aan de landbouwers, ontwaart men, dat van de arbeidzaamheid van dit volk, door betere handen bestierd, een onberekenbaar nut zou te trekken wezen. Een *battor*, of Javaan die tot het dragen van goederen is bestemd, loopt onder de zwaarste dragten, in den brandenden zonneschijn, blootvoets, door ongebaande wegen, over steenen en steile klippen, zes a acht uren daags, terwijl hij tot onderhoud van zijne ligchaamskrachten, zich met het eenvoudigste voedsel, bestaande in rijst en een weinig gedroogde visch of vleesch, te vreden houdt.

Men ziet aan het maken van de rijstvelden, hoe ver het beleid van den Javaan gaat, en hoe zij de rivieren weten te leiden en optedammen,

om de uitgestrekte velden onder water te zetten en voor de rijstteelt geschikt te maken. De ploeg en *patjols* of spaden, waarmede zij het land omploegen en bewerken, zijn zeer een voudig en beantwoorden volkomen aan het oogmerk, in een steenachtig en ongelijk bergachtig land. Met het invoeren van Europesche ploegen zou daaromtrent geene verbetering plaats vinden, ofschoon het aan de vermeerdering van eenige uitlandsche producten veel nut zou toebrengen. Ten tijde toen de vaandrig *Paul Pauise* op Salatiga als kommandant lag, had hij ondernomen om eene Kaapsche ploeg te vervaardigen, en met zes ossen bespannen daarmede te ploegen, maar hij vond zeer schielijk, dat zulk een werktuig alhier niet voldeed, en dat ofschoon herzelve al beter mogt bevonden geworden zijn, het voor een gemeenen Javaan echter ondoenlijk zou zijn de kosten goed te maken, om zich zulk eene Kaapsche ploeg en het geen daar verder toe behoort, aanteschaffen.

CHYMICALE ONTLEDING

Van het warm-water, dat aan den voet van den zoo genaamden Blaauwen Berg ontspringt, bij den Inlander onder den naam van Tjipannas bekend,

Door S. C. KRIEL & JOHN SCOTT, M. DRS.

CHYMICALE ONTLEDING

Van het warm water, dat aan den voet van den zoo genaamden Blaauwen Berg ontspringt, by den Inlander onder den naam van Tjipannas bekend en het welk in het jaar 1744, op de reize van Zyne Hoog-Edelheid naar de Bovenlanden ontdekt is.

Door S. C. KRIEL & JOHN SCOTT, M. D.

Door den heer *J. Scott*, mijnen waarden Collega, eene kalabas vol van dit water ontvangen hebbende, dreef mij de nieuwsgierigheid, het zelve, zoo naauwkeurig als mogelijk was, te ontleden, terwijl ik tevens van ter zijde gehoord had, dat zijne Hoog-Edelheid zulks zeer verlangde. De kalabas met een kurk, harpuis en gewast linnen wel voorzien, zoo dat geene grove lucht er in noch uit kon komen, werd in onze tegenwoordigheid geöpend; maar geen de minste reuk ontwaard. Te gelijk werd met dit water, eene gereed zijnde groote glazen kolf, tot op eene vooraf gemetene en gemerkte hoogte gevuld, in het zand gezet, en met eenen glazen helm en recipient, zoo schielijk als mogelijk was, wel geluteerd en tot distilleren klaar gemaakt.—Onder het storten in de kolf werd eene zwavelachtige reuk ontdekt, als bij het maken van het lac sulphuris, doch veel zwakker.—In de kolf waren van te voren zes en dertig ponden regenwater gegoten, en de hoogte, hoe verre het strekte, gemerkt, om naderhand netto zoo veel van het Bron-water daarin te doen; gelijk ook geschied is.

De bestanddeelen in dit bron-water onthouden en door het overhalen ontdekt, zullen beneden breeder aangehaald worden; vooraf dienen te gaan eenige experimenta, die aanstonds bij het openen van den kalabas door ons gemaakt zijn.

1.) Acida vegetabilia, als succus citri, acetum &a. daar mede vermengd, veroorzaakten geene de minste effervescentie noch troublering.

2.) De Spiritus nitri fumans en Aqua fortis, veroorzaakten eenen kleinen witten damp, zonder effervescentie of eenige andere verandering.

3.) De Spiritus vitrioli concentratus of het zoogenaamd Oleum vitrioli, gaf geene de minste verandering daar in.

4.) De Liquor Salis Tartari fixi, of het zoogenaamde Oleum Tartari per deliquium gaf wel geene effervescentie, maar veroorzaakte eene witte melkverwige troublering, welke door het staan als vlokken op den grond van het glas zakten.

5.) Op gelijke wijze geschiedde zulks ook, door Alcalia volatilia, als Spiritus cornu cervi, Spiritus Salis Ammoniaci enz.

6.) Een kooksel van Galnoten met dit water vermengd zynde, veranderde in het minste niet van kleur. Daarentegen een druppel van de Solutio vitrioli Martis dit kooksel, ten eerste donker purper, en meerdere druppels het zelve zwart verwden.

7.) Ook wierd eene Tinctura aquosa rosarum rubrarum exsiccatarum, bij gebrek van een' sijrupus rosarum, daar mede vermengd zijnde, niet veranderd van kleur.

8.) Eene kelder-flesch, houdende netto 6 lb. gedistilleerd water, woog 62 greinen meer, dan zij met klaar en lang gestaan drink-water ge-

vuld wierd; maar als zij met bron-water gevuld wierd, woog zij twee drachma's en 24 greinen meer dan het gedestilleerde water.

Het bron-water dat wij met de kolf tot distilleren in het zand gezet hadden, werd met alle voorzigtigheid tot de droogte overgehaald, en bevonden in allen deele gelijk te zijn aan gemeen gedistilleerd water zonder reuk en smaak, van gelijke zwaarte enz Na dat een andere recipient aangelegd en geluteerd was, werd van nieuws wederom allengskens gestookt tot den hoogsten trap van sublimeren en in zoodanige hitte zes uren lang onderhouden, zonder dat zich echter iets anders, behalve eenige weinige druppels klaar en helder vocht in den recipient vertoonden. Alles koud geworden, uit het zand gehaald en naar behooren van elkander gezonderd zijnde, wierden in den recipient vijftien a zestien druppels opregte spiritus salis marini acidi gevonden; en op den bodem van de kolf eene witte aarde, zeer zoutachtig van smaak en die met het oleum vitrioli vermengd zeer hevig effervesceerde, heet werd en eenen witten corrosiven damp deed opstijgen. In de kolf en helm waren geene flores sulphuris, noch iets dat daar naar geleek, De zoutachtige aarde werd met eene genoegzame kwantiteit kokend water uitgeloogd, het vocht door een dubbeld vloeipapier gefilteerd, en het klare vocht in een glas op een zacht vuur geinspiceerd, tot dat zich een vlies boven op hetzelve vertoonde, en dan in eene koele plaats ter kristallisering gezet. De kristallen, die zich in allen gelijkformig aan kristallen van zee-zout vertoonden, wierden uitgenomen en gedroogd, het resterend vocht wierd wederom geëvaporeerd

tot droog worden: al het verkregen zout werd van gewigt bevonden te zijn eene once, eene drachma en zes grein.

Dit zout was volgens de gedaante der kristallen, van wegens de witte dampen, heet worden en effervesceren met het oleum vitrioli, en van wegens het kraken op het vuur, volkomen gelijk aan het zee-zout.—De aarde in het filtrum overgebleven en in de zon gedroogd zijnde, had aan gewigt drie drachma's en twaalf greinen, was wit van kleur en zeer subtiel, blijvende aan de vingers kleven, als men ze wreef, en scheen niets anders als eene kalk-aarde te zijn of eene terra alcalina; vermits dezelve met ieder acidum vegetabileren minerale hevig effervesceerde. Als men dezelve aarde in eene smelt-kroes op het vuur gloeide, wierd geen damp, brand of verandering van kleur bemerkt; alleen wierd dezelve door het branden nog witter en eenige weinige greinen ligter of min tot aan gewigt; mogelijk dat nog zoo veel water daar in verborgen lag, dat er door hitte der zon niet heeft kunnen uitgehaald worden

Wat aangaat de werking van dit Bron-water in en op het menschelijk ligchaam, zoo kan hetzelve, volgens de door de scheikunde ontdekte proeven, niet voordeelig zijn, als enkeld bij geval; niet tegenstaande deszelfs, vele krachten en deugden door de Nouvelles in het jaar 1745 zoo zeer opgeheven en vergroot zijn; want het zout daar in onthouden geheel overeenkomende met het zee-zout, heeft ook dezelve kracht en werking op het menschelijk ligchaam; namelijk als het in het bloed gaat en menigvuldig of in groote kwantiteit gebruikt wordt, veroorzaakt het scherpigheid in het bloed en verwekt daar door

scheuringen in de kleine bloedvaten, schurft, scheurbuik, kwaadaardige zweren, verrotting des tand-vleeschs, enz.

De subtiele kalkachtige of alcalinische aarde, hoe fijner dezelve is, hoe eerder en ongevoeliger zij de mondjes van de melkvaten mede inslippen kan, vervolgens door de geheele massa van het bloed gedreven zijnde, ook de allerfijnste vaten van het zelve mede passerende, daarin verstoppingen verwekken kan en een oneindig getal van ziekten, die daaruit oorspronkelijk zijn, voornamelijk als dezelve door plaatsen passeren moet, daar geene spierachtige beweging eenige hulp bijbrengen kan, als daar zijn de hersene, de lever, de milt en wel voornamelijk de klieren. Maar als dit water, in zeer gevoelige subjecten, braken en afgang door zijn inhoudend zout verwekt, en vervolgens wederom met geweld van onderen en boven uitgedreven wordt, kan het zelve bij geval, in ziekten, die zoodanige ontlastingen vereischen, goed doen.

SHORT ACCOUNT

OF THE

MEDICINAL PLANTS

OF JAVA.

[illegible]

[illegible]

[illegible]

[illegible]

SHORT ACCOUNT

OF THE

MEDICINAL PLANTS

OF JAVA.

The following account of the Medicinal Plants of the Island of Java naturally divides itself into two parts; the *first* comprises those that are already introduced into the European systems of Materia Medica, those that are mentioned in the treatises on Indian plants, and those that have been added by the writer of the following Essay: all of them having been subjects of observation or experiment, their virtues and effects, however imperfectly and partially, are, in some degree, ascertained and demonstrated.

The *second* part contains those Medicinal Plants which are employed in the daily practice of the Javanese or Natives: a small number of these belong to the classes of those above mentioned; the greatest proportion, however, have not yet been subjects of investigation or experiment. As my object at present is to give a concise, but at the same time as far as possible, a general and satisfactory view of all the Medicinal Plants of the Island, both of those introduced into the treatises of Materia Medica and of those mentioned only by writers treating exclusively on Indian plants (whose works, being scarce and voluminous, are often inaccessible to persons desiring information) I have premised a comparative table containing the articles, of both classes, to which I have added subjects that

have been discovered or added during my botanical and medical researches on the Island.

The articles used by the natives, which cannot be arranged under regular classes, wil from the second part of this Essay.

The subjects of the first table being described in all treatises on Materia Medica, are in general sufficiently known: of several, however, the accounts are extremely obscure and vague; these depend on future trials and experiments for a satisfactory elucidation of their qualities and uses. I shall mention them in the order in which they occur in the table.

The *Datura Fastuosa*, called *Cuchubung Kassian* bij the Natives, resembles in its effects the other species of this genus; greater virtues are ascribed to it than to the Stramonium by the inhabitants of India. It is considered as a very excellent remedy in the cure of the Asthma on the coast of Coromandel and on Ceylon.

The Javanese employ it chiefly as an Anthelmintic, and externally in the cure of Herpetic diseases; it is a very beautiful plant, and may be cultivated in the gardens both for use and ornament.

Strychnos Colubrina L.--Widoro Pait, of the Natives. Although the accounts of this medicine by several writers on the Materia Medica are not very favourable, from its general employment by the Natives of Java and the Eastern Islands, it deserves a more accurate investigation; according to Rumphius, it is used in the Tertian fever, and as an Anthelmintic and Stomachic; the name is derived from its use in the cure of the bites of serpents. Its taste is intensely bitter, and it belongs to the violent narcotic plants,

which must be used with caution; it has been employed by several physicians of the Island in a spirituous infusion with good effect as a common bitter. The Javanese generally apply it externally, triturated with water, in diseases of the skin, and to alleviate the pain and inflammation in confluent small-pox; they also use it as an Anthelmintic.

Cannabis Sativa—*Ginyè* of the Natives in the environs of Batavia; this is the *common* hemp. It is rarely met with in the Eastern parts of Java; in the vicinity of Batavia it is cultivated by the Moors and Malays.

The effects of the leaves of this plant, whether employed fresh, by giving the expressed juice, or dry by inhaling the smoke, are most violently narcotic and stupifying; they are even perceived externally applied as a cataplasm.

The investigation of its effects is perhaps more curious than useful; it might be an object to determine in how far the extract of the leaves agrees with the Thorn-apple, Night-shade and Hen-bane.

The work of Tumphius contains some curious information on this subject, which is to long to extract.

A number of authors are here referred to who treat of its effects. It is also mentioned in the Hortus Malabaricus; it produces exhilaration, intoxication, sleep or madness, according to the dose in which it is employed; it has a peculiar effect on the venereal appetite. Linnæus, describing the plant in his Materia Medica says: vis narcotica, phantastica, dementens, anodyna, repellens.

The seeds may be usefully employed as an emollient in various diseases; an emulsion is recommended in the gonorrhœa.

Ophioxylum Serpentinum—Puli Pandak of the Javanese. This is one of the Javanese Medicines which deserves most attention. It is described by Burman in his Thesaurus Zeylanius and by Rumphius in the Herbarium Amboinense. The description of the latter was made from a plant introduced into Amboina from Batavia. Both authors give a figure of it.—In Murray's Apparatus Medicaminum it is confounded with the Ophiorhiza Mungos, to be mentioned hereafter; the description which this author gives of the latter evidently applies to the Ophioxylum. It is of some importance that an error, which has been copied into several other books, should be corrected in one of the best treatises extant on the Materia Medica. The stem of the Ophioxylum is shrubby and low, the root is in general about 6 or 8 inches long, woody, simple, cylindrical, straight or a little incurvated and serpentine, of about the thickness of a finger, of a white colour, and covered with a spongy grey or darkish bark.

As to its medical use I have to offer the following extracts. *Burman* (in his Thesaurus Zeylanius) says in Ceylon this plant is highly praised as an antidote to the bite of venomous serpents; the powder is exhibited to the dose of half a dram and upwards. *Rumphius* ascribes to it the same virtues, and adds that at Batavia, it is generally exhibited as a remedy in cholera and bilious vomiting. *Bontius* (in his Hist: mat: med: Ind:) asserts that the

Natives of India completely cure their fevers with the remedy.

Garcias ab Horto recommends it as stomachic. It has also been employed as an anthelmintic. It is mentioned by various other medical authors of the beginning of the last century, as Kæmpfor, Grimm and Cartheuser. During late years, it has not, as far as I have learned, been applied in disease or subjected to experiment

The root yields a strong bitter infusion; its sensible qualities appear to corroborate the testimony of the most celebrated writers on Indian plants, and indicate considerable activity.

It depends, however, on future experiment and observation to determine with certainty its effects and use; I earnestly recommend it for future trials.

The Javanese use it as an Anthelmentic—I have discovered two other species of this Genus, which will be mentioned below.

The Ophiorhiza mungos is a very different plant; Burman, in his Flora Indica, has fallen into the same mistake with Murray; the Synongm quoted under this head is the true Ophioxylum Serpentinum, figured by Rumphius in his Auctuarium, on the 16th table. The stem of the Ophiorhiza is strictly herbaceous, the roots virtues of the plant differ essentially from the Ophioxylum: the character of the Pericarp, which is a compressed two-lobed capsule, renders it very distinguishable. In Linnæus's Materia Medica there is a bad figure of it; while the Ophioxylum Serpentinum promises to afford a valuable medicine, the sensible qualities of this (as far as I have been able to determine)

are feeble, and indicate little activity. It is almost insipid, and appears in quality inert.

Areca Catechu—This palm is mentioned in most books of Materia Medica.

It was formerly supposed the Terra Japonica or Catechu was prepared from it. This error has long since been corrected, and the Catechu is known to be prepared from a species of Mimosa. This species of Areca, the common *Pinang* of the Malays, which is called *Jambi* by the Javanese, and grows abundantly on every part of the Island, (its fruit being employed in chewing Betle) is a mild astringent and may deserve some attention as a medicine of this class. I therefore mention it in this place. To the same class of mild astringents belongs the *Lawsonia inermis* of Linnæus, called *Pachar* by the Javanese—which is also mentioned by writers on the Materia Medica. It may perhaps deserve some attention. Rumphius gives an extensive account of its various uses.

Spilanthus Acmella of Linnæus—It was formerly called *Verbesina Acmella: Srunen* by the Javanese. We have some very interesting information concerning this plant in Murray's Apparatus Medicaminum, which rests on very good foundation. A dissertation was published on it by Breyn in Holland about the beginning of last century. It was formerly employed in Ceylon, and afterwards in Holland, as a solvent of the stone in the Bladder. Holton has published a dissertation in the Philosophical Transactions (of the Royal Society) in which several cases are related of persons having been cured by it. It is strongly recommended by the above mentioned and by several other authors, in di-

seases of the Urinary Organs arising from Stone or Gravel.

It acts in some measure as a diuretic: in several cases it was necessary to combine it with an emollient to moderate its action. It was also useful in dropsy. The sensible qualities are an aromatic, somewhat astringent, and bitter taste; it has generally been exhibited in an infusion with water. It may also be employed in powder or as a spirituous infusion. The leaves are used. Linnæus ascribes to it: vis Anodyna, Attenuans, Diaphoretica, Diuretica emmenagoga. From the credit of the authors who mention this plant, it doubtless deserves further trials: it may be a useful remedy in certain stages of dropsy.

Croton Tiglium, *Cheraken* of the Javanese. I insert this plant here, not to recommend the use of the Grana Tiglia, now justly exploded from practice, but to give a few extracts from Rumphius concerning the use of the root in dropsy—which is a safer way of exhibiting this violent plant. In speaking of its virtues he says:

Portugallicis enim temporibus hæc grana parum in usum adhibita fuere, contra *Radices* ibi in usu fuere, quæ etiam facilius adsumi possunt, atque circa annum 1630, non tantum per totam Indiam sed etiam in Europam transmissæ fuere, uti & meo tempore Chirurgi in Nosocomio bonas instituerunt curas in Hydropicis nautisrasæ seu contritæ radicis digitabulum sumitur, infunditurque debili potui Arack, qui in Hydropicis urinas simul fortiter movet ac expellit.

The two following quotations are extracts of a letter from Mr. *Artus Geysels*, one of the

Governors of Amboyna, on whose authority they are inserted by Rumphius.

In cistula hac mittuntur quædam radices, quas in reditu meo expertissimas habui contra hydropem, immo in patria varios homines ac animalia hisce curavi uti & hic in Amboina in Nave Medenblick dicta illas institui unde & necesse habui, quasdam Bataviam trans mittere, interillos qui patriam redeunt, distribui possint. Radix autem hæc radenda est, quo subtilius, eo melius, ac mane cum vino vel potu arack adsumenda est quantum digitabulum contineri potest.—

In littera alterna subsequenti Junio data hæc scribit: In proxima missione mittemus quantitatem magnam ligni vel radicis, contra Hydropem, qua hic quotidie multi curantur, atque optimam esse magis magisque experimur. Amboinenses vero tam durum habent os, ut radicem hanc minutim conscissam cum Pinanga masticent, ac deglutiant contra Hydropem talesque Leucophlegmatias. Immo quidam illorum gloriantur sese quinque ejus plantae ossicula simul adsumsisse, quod tamen nulli suaderem imitari, nec etiam diu post illius adsumptionem quis Jejunus sit, sed superedenda est pulticula quædam oryzae, vel simile quid, ita ut licet haec planta magnis gaudeat viribus, summa tamen prudentia sit adhibenda; cujus ulteriorem investigationem illis relinquo, qui Medicinam profitentur, quod non est meum institutum.

The seeds are commonly employed as a purge by the Javanese.

Siamim Indicum, *Wijen* of the Javanese.

The seeds were formerly employed in Europe as an emollient: the same virtues are likewise

ascribed to the leaves, applied in Catap lasms and baths.

In this country, where both may be procured fresh, it may deserve some attention; the plant doubtless is possessed of resolvent qualities—Rumphnis gives an extract from Prosper Alpinus, concerning its use, which is too long to be inserted here.

Sapindus Saponaria, *Rarak* of the Javanese; this may be called the Soap-tree. I refer for a minute Chemical analysis of the fruit to a memoir presented to the Batavian Society.*

Coraia Myxa, *Kendal* of the Javanese. This is met with in writers on the Materia Medica under the name of Sebensten or Myxa; the dried fruit is generally brought to Europe; but being in general damaged, musty and worm-eaten, it is seldom employed. It yields upon maceration a plentiful mucilage, which is recommended in all cases where an emollient is required; it is particularly useful in diseases of the breast and in inflammatory affections of the urethra.

The fruit is also possessed of a gentle loosening or cathartic effect: ten or twelve drams of the pulp have a similar effect to the same quantity of the pulp of cassia.

In some parts of the Island the fruits may be procured fresh in considerable quantity—here they may furnish a useful and pleasant emollient.

The bark is one of the chief remedies of the Javanese; it is employed in fevers, and appears to be a mild tonic.

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* 7th Vol. Transactions, No.

In the *Second Column* are contained those medical plants which are mentioned by the principal writers on Indian plants.

The works of Rumphius and van Rheede stand foremost among these, after which Burman's Thesaurus Zeylanicus, Garcias ob Horto Historia Aromatum, Clusius' Works on Exotic Plants, Bontius's Historia Naturalis et Medica Indiæ Orientalis, and several others of less importance, may be consulted with advantage; I have collected in the following remarks concisely the most creditable information contained in the works of Rumphius, of Burman, and of some parts of van Rheede: the extracts from the other writers, not having their original works in my possession, rest on the authority of quotations; several of the plants mentioned I have myself examined with some attention—these I have pointed out more particularly—they deserve further notice and investigation.

I have chiefly extracted such passages from the above mentioned authors, as appear to rest on actual observation, and throw some light on the virtues and objects of the plants described; their accounts in general are very prolix, and tinctured with the superstitious notions and theories of the age in which they wrote.

Stimubant inciting Medicines.

Vitextrifolia—Lagundi of the Javanese. This is a Stimulating Aromatic shrub, which possesses considerable activity. It is mentioned by Rumphius and van Rheede—the former recommends it externally in swellings and diseases of the skin; the latter asserts that the leaves, powdered and taken with water, cure the intermittent fever.

The root, and a bath or cataplasm of the leaves, is applied externally in Rheumatism and local pains in various parts.

Bontius speaks highly of its virtues—he calls it Indian Privet, and asserts that it certainly will supply the want of illelilot and Chamomile in this country. I am confident (he goes on) that a better discutient than the leaves of this shrub is not to be found, and in all pains, even those which are inveterate, they are highly anodyne. A fomentation of them promotes the menstrual discharges, facilitates the birth and cures all disorders of the teruus.

Inwardly taken this medicine promotes urine, affords relief in complaints of the kidneys and bladder, and assuages the pains of the cholic.

Coniza Balsamifera,—*Somboong* of the Javanese; a plant of an agreeable balsamic flavour: the taste is considerably pungent—its inciting qualities are combined with a considerable proportion of mucilage. A warm infusion acts powerfully as a sudorific, and it is very generally employed as a pectoral, as well by the Javanese as Chinese. Several physicians at Samarang have assured me, that they constantly employ it in complaints of the breast, colds, &c.

Baccharis Indica,—*Bolontas* or *Lontas* of the Javanese—a plant more simply aromatic and stimulating than the preceding. It is very generally employed externally in bath and fomentations with good effect. It forms an ingredient in the mixtures which are employed by the natives in various diseases. The three plants just mentioned deserve attention and further experimental investigation. They may be abundant-

ly obtained in every part of the Island, and as soon as the virtues and doses are more accurately determined, may be recommended to and employed by the poorer class of the inhabitants, who frequently are not able to procure the more expensive remedies.

Solanum Indicum,—Trong-ngor of the Javanese. The root taken internally possesses strong inciting qualities. According to Rumphius it is employed in difficult cases of parturition: it is also used as a topical incitant or sialogogue in tooth-ache. The Javanese employ a fumigation of the seeds in the same disease.

Laurus Malabratum—Sintok of the Natives, perhaps I may be mistaken as to the specific name.

The *Sintok* resembles somewhat in flavour the Kuli-lawan, from which it is, however, essentially different: its taste is an agreeable aromatic mixture of the Clove and Cinnamon: that produced on Java inferior to that which is imported from the Moluccas.

Piper Medium—Of various species of Pepper, mentioned by Rumphius, considerable virtues are ascribed to what is called *Pharmacum Magnum* or *Siri Payt*.

According to this writer it is useful, mixt with the bark of the Tabernamantana Pule, to be mentioned hereafter, in the cures of intermittent fevers, pains in the abdomen, &c.

The *Piper Pellatum,—Lomba* of the Malays, and *Gebumbo* of Javanese, is appliedexternally in swellings, dropsy, &c. in the Eastern Islands; it is also a very common remedy among he Javanese.

Cerbera Mangas,—Bintaro of the Javanese. The fruit of this tree possesses a narcotic quality very similar to that of the Datura. I once was witness to the effects of a small dose upon a Javanese woman. During the absence of the dukung (or physician) who was preparing a cataplasm to be applied to an herpertic eruption, she swallowed, out of curiosity, about one scruple of the external part of the fruit. It produced partial delirium; she could no longer distinguish the persons and objects that surrounded her, but retained faculty of speech; the operation went off in a few hours.

The purgative effect of the leaves and bark will be mentioned below. The fruit externally applied as a cataplasm is used in diseases of the skin, eruptions, &c. by the Javanese.

Guilindina Moringa,—Kellor of the Javanese. I have called this and the following plants topical incitants, because they produce, when applied to any part, an irritation and increased action of the vessels of that part, in different degrees, from a mere redness to a blister or eschar.

The root of the *Guilandina,—Kellor* bears the greatest resemblance to that of the Cochlearia or Horse-radish—in its internal and external effects it is possessed of the same taste and pungency—applied to the skin it produces a redness and, if it be permitted to remain, a blistering Internally used it serves the same purpose as the Horse-radish.

In large doses it is even said to produce strangury and abortion, (by Rumphius). The leaves possess these properties a very inferior degree, and are recommended in gonorrhoea as a mild diuretic.

The Thesaurus Leytanirus contains the following information:—

De Morunga, Grimm. in libr. ligt. pag III, in genere dicit.

Radix ipsius excellentissimam nobis exhibit medicinam, quae convenit cum nosra piperis radice, quoad odorem et saporem, quamobrem pro cibis etiam usui adhibetur. Sal ejus est exquisitissimum in Hydrope, Morbo regio, Lachexia, Obstructione Hepatis, Lienis, et in Calculo. Fructus optimum ibi locum habent. Flores in jusculis pro morbis calidis conveniunt.

I cacunot but recommend the further investigation of this plant; it promises considerable utility applied externally as a local stimulant, and its operation internally may deserve some attention. It is mentioned in books of Materia Medica chiefly on account of the oil which in some countries is prepared from its seeds, the Nux Been; by some it is supposed that the Legnum Nephriticim, formerly used, is produced from this tree; this I believe is erroneous.

The white milky juice of the Euphorbia Tirucalli is very acrid and caustic, perhaps it exceeds in violence the other species of this genus.

The Javanese apply it in the cure of Herpes and similar diseases as a caustic. Its evacuating effects will be mentioned below.

The *Plumbago Rosea—Tjintekka* or *Kambang gennee* of the Javanese, is next to the root of the Guilandina, the principal of this class: applied to the skin it produces an effect somewhat analogous to cantharides. It appears to excite more inflammation and pain, but less effusion of lymph: I have universally observed a

great redness and even effusion of blood, upon the application of the fresh root. The *Plumbago* Europea is mentioned in the systems of Materia Medica: it possesses similar inciting properties; it has chiefly been applied topically in tooth ach.

The root of the *Ixora* coccinea possesses this effect in a very inferior degree; it is also employed in tooth-ache where it acts as a mild sialagogue.

The roots of the Arum, called *Sente* by the Javanese, act also as a rube facient; the leaves possess this quality in a less degree.

I add to these the Cassia Alota of Linnæus, which is generally applied in Herpes and similar cutaneous diseases by the natives, and which probably acts by a topical inciting effect—Rumphuis calls it Herpetica.

I proceed to mention the chief of the Tonic medicines described by the writers on Indian plants.

Tabernae Montana—Citrifolia Pule of the Malays and Javanese.

The favourable testimonies which are given of the bark of this tree by various writers, are confirmed bij its general use on this Island. At Batavia it is employed by many of the natives as an antifebrile remedy, in the Eastern parts as an Anthelmintic.

It possesses a pure bitter taste; according to Rumphius it is used in various parts of India in fevers and in Physconia or Ague-ache, it is also recommended as a stomachic and as a general tonic. It belongs to the order of contortae which contains several active remedies, and its

sensible qualities indicate it a subject worthy of more accurate investigation.

Rhamnus Jujuba,—Widoro of the Javanese.

The bark is possessed of mild tonic virtues; it is recommended in weakness of the stomach and in diseases of the intestines. It is of a very inferior degree of activity.

The *Gmelina Asiatica* is mentioned among the medical plants of India—and was formerly in high esteem by the Portuguese, who called it Rais Madre de Deos; the accounts of it are very indefinite and superstitious, it is mentioned by Rumphius on the authority of a communication he received from Malacca. The Javanese call it *Waren* and consider it as a deleterious plant.

The *Aristolochea Indica*, called *Radix Puloronica* by Rumphius, and *Wallas* by the Javanese, deserves more attention.

Rumphius asserts that in Banda this root is much employed as a medicine in diseases of the intestines; it is used as a decoction: in the same manner it also cures intermitent fevers. The roots preserve their bitter taste many years; the same root is employed in Ceylon and on the coast of Malabar as a remedy against the bite of the Cobra Cabela.

The *Serratula Amara*, which is a species of Mimulus and called *Girmot* by the Javanese, is also mentioned as a plant possessing similar virtues.

It is strongly bitter and cures the intermitting fever.

To this class belongs the *Putrowali* or *Andewaale*, which is cultivated at Batavia and other parts of Java.

It is probably a species of Minispermum.—Rumphius calls it Tunis felleus. It has a shrubby winding stem, all the parts of which are impregnated with a most intense bitter. In some of the Eastern Islands it is used in fevers and jaundice.

Under the class of mild Tonics I shall mention the following plants by name, on the authority of Rumphius—they may become subjects of occasional observations, and from his account deserve some credit—viz.—Lobelia Plumeria.—*Porang* volcameria inermis—*Gambir laut*—oxalis sensitina—*Kating-ang* ocymum (a new species called taberosam) *Kentang Jawa.*

Astringent Remedies. The bark of Pterocarpus Draco, kayu sonno or Ansan of the Javanese; of the Spondias, Kadondong, of the Sandoricum, Suttool, of the shell of the fruit of the Garcinia or Mangostan, and that of the steerialia foetida, or Jangkang are astringent, and have all been employed in diseases of the intestines.

In speaking of the Tectona Grandis or Teak tree, Rumphius says of the leaves, the infusion drank as tea is a good remedy in cholera; the wood imparts to water a bitter taste which renders it useful in the same disorder.

The leaves of the Morinda Citrifolia, applied externally, are also recommended by this Author —they are called *Pachi* by the Javanese, and applied in various diseases Bontius mentions their use in Diarhæa and Cholera. Internally they act as a mild emollient diuretic.

Both these trees possess some astringency and both are used in dying.

The fruits of the *Crataeva Marmelos*, *Mollio*, and of the *Phyllanthus Emblica*—*Bowa Malakka* of the Javanese, also belong to this class

To the *Melastoma Malabathrica* and the *Casuarina Equisetifolia*, mild astringent effects are also ascribed.

Diuretics.—the Sentellaria tertea, of Rumphius is a species of the genus Polyscias lately described.—It is cultivated in our gardens and in taste and sensible qualities agrees with the description in the following quotation.

Hæc planta non tantum Hortorum ornamento inservit sed præcipue in Re medica adhibetur, atque ab incolis tamquam Petroselinum seu Apium in usum vocatur. ejusque Folia ac Radix virtutem hebent diureticam, multo efficatiorem, binis præcedentibus speciebus; simulque vel hæc sola aquæ incoquitur & propinatur in Nephritide, contra mictus dolorificos, uti contra dysuriam, mictus cruentos & Gonorrhoeam, seu malumig, Ternatensibus *Ualamu* dictam: hujus recipe Radicem eamque coque in juniore Nuce calappa, cum capitulis quibusdam Florum Tsjampaccæ, ac superioribus Radicibus caricis *Lalan* dictæ, per Noctem Rore hæc expone atque expota hocce decoctum ommem malignam & purulentan expellet materiam, sique Gonorrhœa sit inveterata, hisce adde Radices lisperi rotundi, item commede apices siru boppax atque supremum Radicis lalan cum Pinanga, ac min ;e in candescens Bia codoek, quæ species est concharum crassarum & rotun darum.

Alii coquunt hanc Radicem cum Pinanga, codemque propinant modo. simplex Foliorum decoctum sæpius propinatum fuit in Nosocomia

Hominibus Nephritide laborantibus, quibus urinam vehementer expellebat &a. Rumph. vol. VI cap 30 edit 1790.

The unripe fruits of the Bromelia Ananas or Pine-apple, are diuretic and employed as a remedy in Gonorrhoea. Rumphius mentions the same effect, and ascribes strong emenagogue qualities to them.

The Seruneum Aquatile of Rumphius, called Serunen by the Javanese, is a species of verbesina, and resembles the Aconella in qualities. It is particularly recommended in gonorhoea.

Hydrocatill Asiaticca,—Rabassa & Panggaga of the Natives.—The diuretic effects of this plant are mentioned by all writers on Indian plants; it has been found useful in gravel, and is generally employed in gonorrhoea. The *Ruellia Antipada*, *Kroknangsi*, *Cyperus rotundus*, *Tekkee*, a species of smilax (which is a bastard kind of the Schina) and the Halecus terrestris, a species of Croton, possess similar virtues.

The Gum obtained from the Canarium commune, is said to resemble in its effects the Balsamum Copaiva.

To the *Momordica Charantia*,—the *Pare* of the Javanese, and to the *Phyllanthus orinaria*, *Manirang China*, considerable virtues are ascribed in the gonorrhoea and in obstructions, gravel, &c. from the universal testimony of the Natives, they appear to possess some activity.

The leaves of the *Momordica Charantia* are employed hy the inhabitants of the Moluccas, as a substitute for hops in the preparation of Small Beer.

The Island of Java produces a number of plants which possess *Antelmintic* qualities. Those used by the Natives will be mentioned hereafter: most of the Tonics and Bitters of this Catalogue are occasionally used as remedies of this class.

Among those enumerated by Rumphius the following deserve most attention.

Guilandina Bonduc, *Klichi*

The seeds of these are pounded and given to children. The root possesses Tonic qualities and is useful in diseases of the stomach.

Quisquolis Indica—These plant is called *Udani*, the seeds *Chigau*.—These are an efficacious Anthelmintic, and have been employed where other remedies have failed.

Anthelmintics of less note are the seeds of the *Carica papaya*, and of the fruit called *Lansa* or *Langsab*. All the parts of the tree named *Pangium* by Rumphius, particularly the bark, the leaves, and the shells of the fruit, are said to possess a powerful Anthelmintic effect The seeds of fruit which are called *Kluwak*, are used by the Javanese as an article of diet.

Cathartics—The *Cerbera Mangas* and *Excaecaria Agalloccha* are of a very violent nature, and must be employed with cauton: the purgative qualities of their bark ought, however, to be noticed; of the latter Rumphius says: Apud harum insularum incolis majori in usu Medico est quam populis occidentalibus, qui corticem ejusque lac ad forte adhibent purgans, sed talibus in hominibus qui robusto constant corpore ac valent viribus, et malignis repleti sunt humoribus.

The mode of exhibition is the following, which is described in treating of the Cerbera Mangas

Frusta corticis trunci adhibentur illarum arborum, quae a mari distant, ad palmae longitudinem, vel frustum radicis spithamam longum, abradatur ejus pars exterior rugosa, quae abjicienda est, caetera pars in tenuissimam radatur scobem, quam transcole per linteum ejusque lymphae poculum ingere; post binas horas sine molestia alvum commovebit et subducet, ita tamen ut quis incedere viamque prosequi possit.

The two following species of Euphorbia promise more utility: they are also very active and must be used with caution—but in violent diseases remedies of this kind are necessary, and are to be employed when the more safe and mild remedies are inefficient.

Euphorbia Nerüfoia,—Su-suru of the Javanese. The Hortus Malabaricus says of this, "the bark of root, boiled in rice water and Arrack, is useful in the dropsy, and is an extremely convenient remedy: the milky juice boiled with butter and exhibited, loosens the bowels. The leaves warmed (and applied to the abdomen) create a discharge of urine; boiled and applied as a fomentation, they ease the pains of the body." *Edition of van Rheede in Dutch.*

The milky juice of this plant, dried in form of a gum, can more conveniently be exhibited—it acts as a diuretic.

I once applied it in a case of dropsy in the dose of a few grains twice a day, and it evidently relieved the patient. It may be given with perfect safety.

The *Euphorbia Firucalli*,—*Kayu Urib* or *Patta Tulang*, is perhaps more violent in its operation. The Hortus Malabaricus recommends the root to be used in decoction, in pain of the intestines; it acts as a cathartic: similar virtues are ascribed to it as to the Shadida-calli or Euphorbia Antiquorum.

The *Hernandia Sonora*,—*Bangka* of the Javanese. is mentoned as a mild cathartic by Rumphius—both the bark and leaves triturated with water, or used as a decoction, gently loosen the bowels, and are recommended in Physconia; the same effect is ascribed to the leaves of the Basella rubra, the expressed juice of which is recommended to persons who cannot bear strong purgatives.

Emetics.—The only Javanese Emetic of which we have a somewhat satisfactory account is the Crinum Asiaticum: I suppose that the two other species which are found on the Island, the Latifolium and Zeylanicum, nearly agree with it—Rumphius enlarges on the efficacy of the first mentioned species, in curing the disease produced by the poisoned arrows of the Macasars in the former wars in the Eastern Islands. He calls it Radix Toxicaria. It acted as a violent emetic; upon becoming acquainted with the virtues of this root, it was constantly kept at hand by those soldiers that were exposed to the wounds of the poisoned arrows, which were more dreaded than those occasioned by fire arms Perceiving themselves wounded, they were ordered to take as much of the root as could be taken into the mouth, to chew it, and to swallow the juice: this soon produced a violent

vomiting and sweating, and the effects of the poison were almost certainly counteracted.

The remedy has als been found useful in other diseases. I refer to the above mentioned author for further Information.

I have subjected the Crinum Asiaticm to some experiments, an account of which has been given to the Batavian Society.*

Under this head I mention the *Asclepias Gigantea*,—*Waduri* of the Javanese, which doubtless possesses active properties.—It remains to be determined whether it acts as a Cathartic or ar an Emetic I would recommend its root to occasional trials. Both the work of Rumphius and the Hortus Malabaricus ascribe considerable virtues to it, chiefly as a remedy against the bite of Serpents: in this it probably agrees with the more active remedies of this class.

The root of the *Cicca Disticha*,—*Chermài* of the Javanese, is said to be an Emetic, and great activity is ascribed to it; it is mentioned by Cr. *A. Costa.* Perhaps it acts too violently to be used as a medicine: this remains to be determined.

This root is mentioned among the dangerous plants of the Island. Emetic qualities are also ascribed to the *Justicia Gandarossa*, *the Ganrusa* of the Javanese. and to the pulp of the seeds of the *Mimosa scandens*—the determination of their efficacy depends on future observations.

Emollients—The flowers of the *Hibiscus Filiaceus Populneus* and *Mutabilis*, belong to

* Vide Transactions Vol 7.

the simple Emollients: the *Sida Abutilon* and *Retusa*, two species of *Urena*, and several other plants of the class of Monadelphia; the bulbous root of the *Musa paradisiaca*, called *Bongol Gedang*, and of the *Corypha umbraculifera*, called *Bongol bas*, appear to be simply lenient and emollient.

I shall conclude the enumeration of the articles of the second column by the following medicinal plants, which, to a cooling, mucilaginous, or emollient quality, unite in a small degree some other effect.

In the *Hibiscus Rosa sinensis wariban*, mentioned by authors with considerable credit, and also employed by the Javanese, a large proportion of mucilage is combined with a diuretic and expellent property, and in the Abrus *praecatorius* saga, the mucilage is united with some bitter. The *convolvulus pes caprae* is mucilaginous and tonic.—The Bryonia *Cordifolia Papassan* is a useful, cooling, slightly expellent remedy.

The roots of the *Cassia planisiliqua* are recommended in gonorrhœa, and those of the *Dracaena terminalis Andong* in Dysentery.

The root of the *Acalypha hispida* has been found useful in Hemoptisis—it is joined to the bark of the *Tabernaemontana uri lia Poole*, above mentioned, and to the root of the Cyperus rotundus (a useful emollient). The *Plumeria mandakaki*, different from most of the plants of the natural order of contortoe is lenient, moderately diuretic and expellent; the same quality is ascribed to the *Callicarpa tomentosa*, *maneerang*, and the *Callicorpa songko*, to the bark and flowers of the *michelia champaka*, and to

the *Calophyllum Inophyllum.* The *Cotyledon laciniata* and the *stapelia* (*Pitshesan*) are refrigerant and useful in fevers—the same is asserted of several species of *Cissus.* Gentle emollient and expellent virtues are also ascribed to the *Achyranthes lamppacea*, the *Barleria Prionites* and the *Helicteres Isora*

The *Acanthus illicifolius*, *Jerujo* is recommended by Bontius in complaints of the breast as an oxpectorant—and the *morus indica* is useful in gonorrhœa and Dysentery.

REMARKS ON THE THIRD COLUMN.

STIMULANTS.

Jacca pinnatifolia—Tinggiling mentik.—My attention was first directed to this plant by remarking the repute which it is held in by the natives. It is employed both at Batavia and in the Eastern parts of the Islands, internally as a stimulant or tonic, and externally in contusions and swellings—infused with water, it yields a bitter mucilagious fluid, with a peculiar aromatic taste, somewhat inclining to that of the Arum. I think it deserves some attention and enquiry. It grows in fertile grounds near the foot of large mountains.

The form of the root is globular, somewhat compressed and incurvated, resembling a kidney and is about the size of a nutmeg.

Laurus—Krangeang of the Javanese.—This species, as far as I have been able to accertain, is not yet described; it agrees in flavour and sensible qualities with the Laurus Nobilis of Linnæus, and may become useful as an external remedy. The berries, which have a strong,

pungent, aromatic taste, are employed as a condiment by the natives; several othe species of Laurus, of less evident activity, are employed in their practice.

Betonica—*Chun-gul.*—A plant of a very agreable aromatic flavour, agreeing in sensible qualities with several other plants of the natural order to which it belongs, for example the Teucrium, Melissa, &c.

The infusion of the dried leaves is of a dark brown colour; its taste is pleasantly aromatic and somewhat bitter. It is diaphoritic, and may supply the place of the other plants of this order in common use.

Valeriana,—*Kettull-gunung*.—Its specific characters approach very near to the Valeriana Officinalis of Europe, perhaps it may be somewhat modified by climate; its sensible qualities are the same; it remains to be determined in how far it agrees with in effects and use.

Eupatorium,—*Te-gunung*—The infusion of this plant has an agreable exhilarating effect—its odour is aromatic, and somewhat pungent; it strongly resembles the Eupatorium *Aya-pana*.

It grows only in the elevated situations of the Island, where the natives, that are acquainted with its use, employ it in infusion, as a common drink in fevers and colds.

From the following three plants essential oils are prepared, which possess a strong stimulalating effect, and are useful externally applied

1—*Andromeda* (a new species) *Gandapuro* of the Javanese. The oil has a peculiar odour, and is very volatile and heating; it is greatly in repute among the natives in rheumatism.

The Gandapuro is a shrub, and grows only in elevated situations: all the parts of it are penetrated by its peculiar flavour.

2—The shells of the fruit of the *Amyris Proticim*, *Tung-gulung* of the Javanese, afford an aromatic essential oil, which is useful as a substitute for the oil of turpentine, and similar stimulating oils.

3—The pericarp of the *Randu-basin* of the Javanese, (a doubtful genus) likewise contains a large portion of an aromatic oil.

I shall add to these the *Weluling* of the Javanese, (forming a new genus) which acts peculiarly on the salivary glands; the stem is covered with a rough bark of a pungent aromatic quality. Like other Sialagogues it produces an increased flow of saliva, and is very generally applied by the Natives in tooth-ach, and as a roborant of the gums. The taste is hot, but by no means disagreeable, and it produces an astringent effect on the gums.

TONICS.

Chloranthus Spicatus,—*Kras-tulang* of Batavia and its Environs, *Palu-dengen* in the Eastern parts of the Island.

The odour of the root resenbles that of the Seneka Snake root; the leaves are generally employed, by the Native, as a corroborant; they make an infusion of them. It is also employed in decoction, in the gonorrhœa, and in some stages of the venereal disease. The plant doubtless possesses some virtues. Several cases of mild intermittent fevers have been cured by it: it deserves some further observation to determine its effects.

Mimusops Elengy,—*Tanjung* of the Malays and Javanese. The bark of this is likewise a mild Tonic—it possesses more bitterness and astringency, but less aroma than the *Kras-tulang*.

It has been found useful in fevers and as a general roborant; in some parts of the Island it is in high esteem as a remedy of this class. The bark is used in decoction.—Rumphius mentions various uses to, which the flowers, wood, &c. are applied, but seems not acquainted with the tonic virtues of the bark.

Of the Genus *Brucea* I have discovered two species—the first is called *Fraùalot* by the Javanese, and *Kimonjenjen* in the district of Jacatra; the second *Pati-lalar* on Java, and *Kipait* in Jacatra. All the parts of the first species, the Fraùalot, which has a shrubby stem, the root, the bark, the leaves and the fruit are intensely bitter.

It imparts both to watery and to the spirituous infusion a penetrating bitter taste. Its effects are simply tonic; it is useful in diseases of the stomach and intestines, and in all cases where a pure bitter is indicated. It has appeared to me, that combined with the bark of the *suren* tree, to be mentioned hereafter, which is considerably astringent, it might be very useful in many cases of Dysentery, in the latter stages of the disease.

I have given it to several persons in debility of the stomach and diarrhœa with good effect, both in a watery and spirituous infusion.

In most cases where the quassia or simaruba are generally employed, it may be used with advantage and supply their place—the bitter

taste when infused in water is developed rather slower, but becomes equally strong in a short time.

(As I have described this shrub both in a medical and chemical point of view in a separate dissertation, I refer to that for a more minute detail of my remarks.)

The second species of the brucea, called *Pati Lalar* is a tree of middling size—all its parts are impregnated with a bitter taste, which resembles that of the *Fraùalot;* its name implies that it is obnoxious to insects; it depends on future trials to determine in how far the two species agree in qualities and effects.

From the trials I have made with the first species I can recommend it for further investigation; it promises most utility in diseases of the stomach and intestines, but may probably also be employed advantageously as a general tonic in febrile diseases.

The ophioxylum serpentinum has been mentioned above, and recommended for further investigation. I have met with two other species of this genus which very much resemble it in bitterness; the one is called *Pulean* by the Javanese, and the other *Krodu Kras*—it is very probable that they may in some measure agree with the first species in properties and effects.

The Tabernaemontana—*Leg-garang* of the Javanese, is a new species, which till now I have only met in the Eastern extremity of the Island; it agrees in sensible qualities with the Tabernaemontana citrifolia of Linnæus, mentioned above. Under this head I shall mention the *Porono Jiwa* of the Javanese, which is considered as an antidote in all cases in which

poison has been swallowed: it is one of the remedies in which they place most confidence, and to which my attention has been directed by the high character which it bears among them. Its scarcity prevents it from being more generally employed. It is only found in elevated situations on the fertile declivities of the large mountains. The stem is shrubby, declining and divided into a few slender branches: all its parts are penetrated with an intense bitterness.

The Javanese employ the seeds. One of them is exhibited, after being triturated with water, to counteract the effects of any poison which has been taken into the stomach; in a large dose it probably acts as an emetic. The genus of this shrub is doubtful—I do not find it described—it has some affinity to the Genus Geoffroea—the medicinal qualities deserve to be more accurately investigated.—A species of *Poly-gala*, called by the natives *Sidogoori Lanang* is also in high repute as a Tonic. Its sensible qualities indicate some activity. It has an aromatic odour, and the taste is pungent, acrid and bitter—in this it somewhat resembles the Puly-gala Seneka. The knowledge of the effects of this plant is universal throughout the Island. From the credit it generally receives it may be supposed to possess some useful properties. The stem is herbaceous.

The bark of the *Artacarpus Kluwi* (a variety of the Artocarpus Incisa) is considered as a Tonic by the natives; it has been found useful in obstructions. The Melothria-Sirahan is ranked in the same class; its taste is bitter.

The two last mentioned, to judge from their sensible qualities, possess a very inferior degree

of activity—I mention them on the authority of the natives.

Astringents—The bark of the *Suren* tree; this is one of the most active and valuable of our native medicines. It unites, to a considerable astringency, a proportionate degree of bitterness, while both are accompanied by a very pleasant aroma. Perhaps it more properly belongs to the class of Tonic medicines: it remains for further observations to determine which of the two qualities predominates.

The bark is thick, and, when dried, of a brown or reddish brick colour, that of old trees is darkest—the watery infusion is of an elegant light brown hue, and completely transparent.—It is strongly impregnated with the peculiar taste, odour and qualities of the bark. Exposed to the air, it remains many days without any disposition to change or ferment. It is very antiseptic. A solution of the sulphate of Iron produces, when added to the infusion, instantaneously a black coloured fluid. My attention was accidentally directed to this tree at Onarang: I first considered it as a species of Melia, of which genus the Island produces several; from its similarity in habit I supposed it might possess similar qualities. I therefore subjected it to experiment: a nearer acquaintance proved it to be more active, and to promise greater usefulness as a medicine.

I have since had an opportunity to examine its fructification, by which it appears to be a genus not yet described.

Having first satisfied myself, by various trials, of the safety of its exhibition, I recommended it to an intelligent Surgeon in the Dutch Navy

who employed it advantageously in various cases of Chronic Dysentery. A communication, shewing the dose and manner in which it was used, was directed to me, which will be made use of in a more ample account of the remedy.

It has since been used by other Physicians, and sometimes with success; several of the cases in which it was employed have been carefully attended to, and described by the persons who made the trials. It has hitherto been employed in the latter stages of Dysentery; it cannot be exhibited while the inflammatory symptoms prevail, as it unites to its astringent a considerable proportion of inciting qualities. The trials hitherto made, as well as its sensible properties, indicate its probable utility in the diseases above mentioned; it may perhaps be found useful in fevers also. It remains for future experiments and observations more accurately to determine its effects.

Rumphius mentions the use of the leaves and of the bark in fevers: my first trials were made at a time when I had no access to his work, and was unacquainted with his description of the Suren.

The Javanese do not make use of it as a medicine.

Another native astringent is the bark of the *Inocarpus Edulis*, the *Gajam* of the Javanese; in the western parts of the Island it is called *Gatip*, (I have described its medicinal properties and chemical analysis in a separate memoir given to the Batavian Society.)*

* Vide Transactions vol. 7.

I proceed to enumerate concisely the most important of the remaining astringents which I have met with on the Island, to exhibit in one point of view the numerous articles of this class. Several of them are employed by the natives.

Terminalia, Jow-Lawe—a new species; the dried fruit is used as an astringent, the bark is employed in tanning.

Spondias--Rouwe, the bark is a mild astringent—it is employed, among the natives, by females during the months of pregnancy, to prevent abortion.

Sandoricum,—Keduyu—The bark has a strong nauseous taste, with some astringency—the expressed juice, in large quantity, produces vomiting—it is chiefly applied externally.

Sterculia Foetido,—Jangkang.—The legumen is employed in gonorrhœa, the decoction is Mucilaginous and and Astringent.

The following appear to be simple Astringents.

Celtis Orientalis,	.. ..	*Angrung.*
Phyllanthus	....	*Lamir.*
The bark of a doubtful Genus		*Amput.*
Ditto ditto,	....	*Weyu.*
Ditto ditto,	....	*Gentungan.*
Ditto ditto,	....	*Tingi.*
Ditto ditto,	.... *Mimosa,*	*Suggawe.*
Ditto ditto,	....	*Pilang.*

The two following are Aromatic Astringents.

Guareco, doubtful species—*Lolowan.*

Ditto ditto, ... *Kapug-gunung.*

DIURETICS.

Artemisia,—Godomollo of the Javanese.—This species resembles in its qualities the Absynthium or common Worm-wood. It unites to a con-

siderable degree of bitterness, a peculiar aromatic, somewhat volatile flavour. I have placed it in this class because I have more particularly observed its diuretic effects; to judge from its sensible qualities it is probable that it also possesses the other virtues of the Absynthium, and of the aromatic bitters—A case of Ascites which came under my observation was cured by this remedy.

It is likewise very useful applied externally in baths and fomentations, and may effectually supply the place of Camomile and similar remedies. It promises to become a valuable addition to the Javan Materia Medica, and I recommend it for further investigation.

The effects of the other articles mentioned under this head have not been sufficiently ascertained.

The fruits of the Elæocarpus Redjosso, which are called *Anjang-anjang*, are employed as a diuretic by the natives. The bark of the tree is impregnated with a strong bitter.—Both the fruit and the bark may deserve occasional investigation.

The bark of the Elæocarpus avata, *Komessu* is also pervaded by a strong bitter taste.

A species of Indigofera, *Tomtoman* of the Javanese, belongs to this class.

It is considered as a useful remedy in gonorrhœa.

The flowers of the Sambucus, *Patri wulan* have the same flavour as the Sambucus Nigra.

The Spæranthus Indicus has a strong aromatic, somewhat acrid, taste and odour, joined to a considerable bitterness; it deserves some attention as a diuretic and stimulating medicine,

ANTHELMINTICS.

The medicines of this class, as above stated, are numerous: besides the substances mentioned in the second column, the Brucea *Frowalor*, the Tabernaemontana Citrifolia *Poole*, and the Ophioxylulum Serpentinum, *Poole Pandak*, are employed as Anthelmintics. The Melia Azedarach, *Mindi* of the Javanese, and the Melia Azadirachta, *Imbu*, are among the most effectual remedies of this class.

CATHARTICS.

The root of the croton—*Adal-adal*, possesses purgative effects—it has been employed by European Physicians.

The seeds of the Dais Octandra, *Pollo-Keyu* are a common purge of the Javanese.

The root of the Plumeria obtusa acts very violently—it might perhaps be useful in a small dose—the leaves of the Cassia Sophera are said to be a very mild cathartic.

EMETICS.

The leaves of the Ticus Septica, *Awar-awar* of the Javanese, are in a small degree emetic—I mention it in this place, as the knowledge of their effects is univeral on the Island, and confirms the account of Rumphius—several of the leaves being infused with vinegar one night, the fluid, taken in the morning, produces a discharge of the stomach.

The root of the Boerhavia Diandra is said to be Emetic; this, howver, remains to be determined more certainly; it grows plentifully on Java.

Some of the chief Javanese medicinal plants are also found in other countries, and are mentioned in the books of materia medica; among others the Ophioxylum Serpentinum, the Spilanthus Acmella, the Strychnos Colubrina, and the Hyperanthera; the accounts of them are by no means satisfactory; we are led to suppose that they belong to the most useful of the articles of the materia medica.

It is of importance to establish, by experimental enquiry, their degree of efficacy and utility, and, if they are equal to the account which is given of them, to bring them from their obscurity into general notice.

Comparative Table of Javanese Medicines.

STIMULANTS.

A.] Articles introduced into the system of Materia Medica.	*B.] Articles mentioned by writers on Indian plants.*	*C.] New Medicines.*
Amomum Cardamomum .... *Kapol*	Vitex trifolia .... *Lagoondi*	Tacca pennatifolia *Ting-geelingmentik*
Amomum Zingiber .... *Dshey*	Vitex negundo .... *Lagunde lawt*	Laurus .... *Krangeang*
Amomum Zerumbed ... *Lampooyang*	Baceharis indica .... *Bolontas*	Betonica .... *Tshoong-gul*
Alpina Languas .... *Lawse*	Solanum indicum ... *Trong-ngor*	Valeriana .... *Kettool Gonoon*
Curcuma Rotunda ... . *Tommo*	LaurusMalabratum .. *Sintok*	Eupatorium .... *Te-goonoong*
Kaempferia Galanga ... *Koomtshur*	Piper peltatum .... *Gebumbo*	Doubtf. Genus .. ... *Welooling*
Rotunda ... *Koontshee*	Piper medium .... *Wode*	——— ... ... *Randoo basin*
Acorus Calamus ..... *Deringgo*	Piper terrestre .... *Katshur*	Amyris Protium .... *Tong-gooli*
Piper Longum		Andromeda .... *Gondopoora*
Piper Cubeba		

MILD AROMATIC STIMULANTS.

Andropogon Schoenanthus .... *Seree*		
Ocymum Bassilicum ... *Komang-gi*		
Ocymum gratissimum .... *Setasse*		
Ocymum Tencufloium .... *Lampes*		

A.] Articles introduced into the system of Materia Medica.	*B.] Articles mentioned by writers on Indian plants.*	*C.] New Medicines.*
		NARCOTIC STIMULANTS.
	Datura ferox ..... *Kootshooboong*	Cerbera Mangas ..... *Bintare*
	Datura fastuosa ..... *K. Kassian*	
	Menespermum coccules ... *Peron*	
	Strychnos colubrina ... *Vidaro pait*	
	Solanum nigrum	
	Cannabis sativa ... ... *Gindshe*	
	Exotic Medical plants cultivated on Java.	*TOPICAL STIMULANT.*
	Anethum foeniculum ... ... *Adas*	Guilandina moringa ..... *Kellor*
	Anethum graveolens ... *Moongsi*	Euphorbia tirucalli ... *Kayoo-oorb*
	Carum Carwy ... ... *Dshintan*	Ixora coccinea .... *Sooko*
	Pimpinella Anisum ... ... *Adas manis*	Plumbago rosea .. *Kumsang gennee*
	Ruta graveolens ... ... *Ingoo*	Cassia alata .....
	Sinapis .... *Sesawee*	Arum ... . *Sente*
	Salvia officinalis	
	Rosmarinus officinalis	
	Mentha crispa	
	M. piperita	

Ophioxylum serpentimum .. *Poole*
[*pandak*

Ophiorhiza mungos
Fumaria officinalis

Punica granatum ..... *Delima*
Areca Catechee ... *Pinang Djambi*
Lawsonia inermis ... ... *Patjar*

TONICS.

Tabernaemontan citrifolia .... *Poole*
Rhamnus jujuba ..... *Widoro*
Gmalina Asiatica ..... *Waren*
Lobelia Plumeria ..... *Porang*
Volcameria inermis ..... *Gambir*
Oxalis sensitiva .... *Katkug-ang*
Ocimum tuberosum *Kentang dshawa*
Mimulus .... *Girmot*
Aristotochia indica .... *Wallas*
Minispermum .... *Pootro-wale*

ASTRINGENTS.

Pterocarpus Draco ... *Sono Ansana*
Garcinia mangostana .... *Mangis*
Spondias .... *Kadondong*
Sandoricum .... *Sottul*
Craraeva marmelos ..... *Modsho*
Tectona grandis .... *Dshati*
Morinda citrifolia .... *Bangkoedoo*
Sterculia foetida .... *Dshangkang*
Phyllanthus emblica ... *Melloko*
Melastoma malabathrica .. *Siggawe*
Ficies Caprificus Amboinenses of Rumphius Casuarina equiseti folia .... *Thomoro*

Chloranthus spicatus
Brucea .... *Trowalot*
——— .... *Patty-lallar*
Mimusops Ellengi .... *Tandshang*
Ophioxylon Spin .... *Koodoo kras*
——— ..... *Poolean*
Tabernaemontana .... *Leggarang*
Doubtful Genus .. *Porono-dsheewo*
Artocarpus .... *Kloowi*
Polygala .... *Sidogoory lanang*
Melothria ..... *Sirahan*
New genus .... *S. Sooren*
Inokarpus edulis .... *Gajam*
Asiduim Pyruferum ... *Dskamboo*
[*bidshee*
Peschynomene grandiflora .. *Toori-*
[*mera*
Terminalia .... *Dshom-lawe*
Spondias new species .... *Rouwe*
Sandoricum .... *Kedooyoo*
Celtis orientalis .... *Angroong*
Phylanthus ... ... *Lamir*
Doubtful genus .... *Ampul*
——— ... *Weyoo*

A.] Articles introduced into the system of Materia Medica.	*B.] Articles mentioned by writers on Indian plants.*	*[C. New Medicines.*
Spilanthus acmella	***DUIRETICS.***	Doubtful genus .... *Gintoongan*
	Polyscias doubtf. sp.	——— .... *Tengee*
	Bromelia Ananas	Mimosa .... *Suggawe*
	Verbesina .. .. *Sroonen*	——— .... *Veelang*
	Smilax doubtf. sp.	***B.] Aromatic Astringents.***
	Hydrocotile asiatica .... *Pang-gaga*	Guaria .... *Lolowan*
	Ruellia .... *Kraknassi*	Guarea .... *Kapog gunoong*
	Canarium commune (the gum)	Artemisia .... *Godomollo*
	Cyperus rotundus .... *Tekkee*	Elaeocarpus .... *Redjosso*
	Phyllanthus niruri & urinaria	——— .... *Komessoo*
	Croton doubtful species	Indigofera .... *Tomtoman*
	ANTHELMINTICS.	Sambucus .... .. *Patree-woolan*
	Guilandina ... ... *Kleetshee*	Sphaeranthus indicus
	Quisqualis indica ... *Oodani dshegou*	Melia Azedarach .... *Mindi*
	New genus (pangium of Rumphius)	Melia Azadirachta .... *Imbo*
	Doubtful genus .... *Langsch*	Contorta .... *Alla-antong*
Colichos prauriens ... *Rawe*	Carica papaya .... *Kates*	Datura fastuosa .... *Kootshooboong*
	piperita	Brucea .... *Trowalot*
		Tabernaemontana .... *Poele*
		——— .... *Leggarang*
		Ophioxylum serpentinum

Tamarindus .... *Assem*
Cassia fistula ... ... *Toong gooli*
Ricinus Comunis .. .. *Dsharak*
Croton Tiglium . .. *Tsheraken*
Jatropha carcas .. *Dsharrak pagger*

Sesamum indicum ... *Weedshen*
Andropogondulce ... ... *Tekkee*
Adianthum Capillus veneris
Trifoluim Melilotus Zreba
Sapindus saponaria .... *Rarak*
Cordia myxa .... *Kendal*

CATHARTICS.

Cerbera mangas .... . *Bintaro*
Hernandia sonora .... *Bongko*
Excaecaria Agallocha
Basella rubra
Euphorbia firuealli
Euphorbia nerufolia

Dais octandra
Croton new sp. .... *Adal adal*
Plumeria obtusa ... *Kambodsha*
Cassia Sophera

EMETICS.

Asclepias gigantea .... *Wadoori*
Cicca desticha .. .. *Tshermay*
Justicia Gandarussa .. *Gandarussa*
Mimoca Scandens .... *Gandoo*
Crinum asiaticum

Ficus .... *Awar Awar*
Boerhavia diandra

EMOLLIENTS.

Hibiscus Rosa Sinensis
——— Tiliaceus
——— Mutabilis
——— Populneus
Sida Abutiton
Cassia planisiliqua
Dracaena terminalis
Acalypha hispida
Plumeria .... *Mandakakki*

Verbesina beflora .. *Oerang aring*
Lacalia Sonchifolia
Sonchus oleracbus
New Genus .... *Som Djowa*
Lichen .... *Djamoos batoo*

A.] Articles introduced into the system of Materia Medica.	*B.] Articles mentioned by writers on Indian plants.*	*C] New Medicines*
	Callicarpa (two spcs) *Manirum and* [*Songko*	
	New Genus .... *Kuwan*	
	Morus indica ... ... *Bobussaran*	
	Acchyranthes lappacca	
	Barleria Prionitis ... *Landul*	
	Helicteres Isora	
	Musa parodisiana ... .. *Gedang*	
	Corypha umbraculifera .. *Gobhang*	
	Abrus praccotorius .... *Saga*	
	Convolvulus Pescaprae	
	Bryonia Cordifolia .. .. *Papassan*	
	Michelia .... *Tshampaka*	
	Calophyllum Inophyllum	
	Cotyledon laciniata	
	Stapelia ... ... *Pitshtsan*	
	Acanthus illicifoluis .. *Dsheroodsho*	

ON THE

MINERALOGY OF JAVA.

ESSAY I.

ON THE MINERALOGY OF JAVA.

ESSAY I.

ACCOUNT OF THE ISLAND FROM ITS WESTERN EXTREMITY TO THE MOUNTAIN OF SUMBING, SITUATED NEAR THE LONGITUDE OF SAMARANG.

IN A COMMUNICATION

TO THE HONORABLE THE LUITENANT GOVERNOR,

THOMAS STAMFORD RAFFLES, ESQ.

Dated April 1812.

BY THOMAS HORSFIELD, M. D.

I shal not attempt, at present, a complete Mineralogical description of the Island of Java; my object is to collect into one point of view the various observations my travels have afforded me on the substances which cover its surface, and which form its bases or solid parts; or to detail those facts and remarks which have presented themselves to me on the general Mineralogy and Geology of the Island.

I purpose, therefore, in the following Essay, to give a general account of the principal and secondary Mountains, of the calcareous ridges and alluvial districts, of the chief Mineral wells, and of several objects of curiosity, in a Mineralogical point of view, which the Island is found to contain.

As I have not had an opportunity of examining every part with equal minuteness, I shall describe with more accuracy those objects and districts which have come particularly under my examination, or which I have traversed with greater leisure; these, I flatter myself, will contribute to give a general idea of the Mineralogical constitution of the Island;—large portions still remain to be investigated; and my endeavour is to extend my researches to those districts which are imperfectly known, in order to collect, at a future period, a more completed Mineralogical history of Java.

The most obvious appearances which present themselves in regarding the Island in a Mineralogical point of view, are—

1.—An interrupted series or range of large Mountains, stretching longitudinally through the whole Island from West to East. These are all volcanoes, and, to distinguish them from those to be mentioned hereafter, I shall call them *primary volcanoes.*

2.—Various ridges of smaller Mountains or hills, extending in different directions, with nearly an equal degree of elevation, sometimes originating from or connected with the primary volcanoes, sometimes forming independent ranges, and arising separately and at a distance from the great series; I shall call them *secondary volcanoes.*

3.—Hills of *calcareous* constitution, with only a moderate degree of elevation, in smaller ridges often with a flat or tabular top, or in separate steep rocks and eminences; though they generally occupy a situation near the northern or southern shore, they are sometimes found in the center of the Island, covering the volcanic districts.

4.—Hills of a *mixed* nature, partly calcareous and partly volcanic. At the base of these, or in the beds of the rivers which proceed from them, are frequently found various silicious stones, as flint, prase, hornstone, jasper, porphyry, agate, cornelian, &c. &c.

5.—*Alluvial* districts, evidently of recent origin, formed from the sediment and near the discharge of the large rivers, at the borders of the calcareous ridges, which are in many instances partially covered by them—their boundary or line of separation from the solid and substantial parts of the Island can easily be traced, and the most of them are still in a state of constant progression, as will appear from their particular description.

6.—*Mineral wells* of various temperatures and admixtures.

7.—Wells of *Naptha* or *Petroleum.*

8.—Rivers arising, in a few instances, from the craters of volcanoes, impregnated with sulphureous acid, clay, &c.

9.—Several objects of curiosity which can only be illustrated by particular description.

§ I. *Series of Volcanoes.*

The first Mountain of the large volcanic series is situated in the district of Bantam, almost directly south of its capital; it is generally distinguished by the name of *Pepper Mountain.* About one degree farther Eastward, nearly in the same latitude, follows the *Gunung* (Mountain) *Salak*, the Eastern foot of which is connected with the *Gunung Gedé* or *Pangerango*, situated nearly in the longitude of Batavia, in the center of the Island, occupying part of the

districts of Buitenzorg and Chi-anchor. The eastern part of the *Salak* covers part of the same districts, while its western projecting hills extend towards the province of Bantam. In the southwest it is united to the Gunung *Gagak*. From the eastern foot of the Gunung Gedé the volcanic series separates into *two* independent branches, one of which inclines considerably to the south, while the other proceeds almost in a direct line to the east, slightly verging to the north; both branches leave in the intermediate space an extensive excavation, commonly called the plain of Bandong.

The southern branch consists of the mountain *Baduwa*, the mountain *Tilo*, the mountain *Sumbung*, the mountain *Malawar*, the mountain *Wyahan*, the mountain *Papandayang*, and the mountain *Chi-koré*.

From the mountain *Papandayang*, an irregular transverse range of Volcanoes extends across the Island, consisting of the *Gunung-gurtur*, *Talaga-bodas*, *Gunung-Kraga*, which approaches the Northern Ridge in the District of Sumadang.

The first mentioned four mountains of the Southern branch are situated in the District of Bandong and Batu-Layang; the Papandayang, Chi-koré and Talaga bodas in Cheribon, the Gunung-Guntur in Timbangantang, and the Gunung Kraga in Sumadang.

The northern branch of the Volcanoes, (originating at the foot of the Gunung Gedé) consists of the mountain *Bu-angrang*, the *Tankuban Praù*, the *Pukit-Tung'gil*, the *Bukit-Jarriang* and the *Manglyang*; their Son-

thern portion occupies a part of Bandong, while their Northern roots extend to Krawang and Sumadang.

The mountain of *Tampomas* continues the general series, after its junction with the transverse ridge, in the Eastern parts of the District of Sumadang.

After an intermediate space of nearly half a degree, follows the mountain of *Chér'mai* commonly called the *mountain of Cheribon*, whose situation is in the Northern parts of this District, at no great distance from the sea:—after another interruption of about half a degree, the Volcanic Series is carried on by the mountain of *Tagal*, situated considerably to the South of the mount of Cheribon, near the center of the Island. From the foot of this mountain several ridges of the secondary volcanoes, (the different volcanic apertures of which will be mentioned below) extend to the Eastward till they unite to the mountain *Sudoro*, the western of two mountains commonly distinguished by the name of the *Two brothers*, both from their similarity of appearance and vicinity of situation. The mountain *Sumbeng* (the second of the brothers) stands somewhat further to the south—they are both situated in the district of *Geadoo*, (or Kadu.)

At a small distance from the Eastern foot of the Mountain Sumbeng, we meet with three large volcanoes in a direction almost North and South, dividing the large series transversely; the Mountain of *Unarang*, the *Marbabu* and the *Marapi*.

The mountain of Unarang, whose projecting secondary ridges extend to the vicinity of

the Northern shore, occupies part of the district of Samarang, and of Kali-wungu; the Western foot of the Murbabu, with several appendages called the hills of Jambu (from which its name of Babu is derived) extends towards the Kadu; the Eastern portion covers a large part of the district of Samarang; in the North it is united to the Marapi, which is situated almost entirely in the province of Mattaram, while its projecting hills incline towards the Southern shore.

The next volcano deviates more than any other from the regular series; the *Mountain* of *Japara*, which forms a particular peninsular appendage to the Island; to its northern roots a smaller mountain of the same nature is connected, called the *Chelaring*, and a separate projecting rock forms *Pulu-mandelique*.

In pursuing the direct course of the large series, we meet, almost one degree to the eastward of the Marapi, and nearly in the same latitude, the mountain of *Lawu*, one of the largest volcanoes of the Island, situted between the districts of Mattaram, Kadawung, Jipang, and Magellan;—not far from the northern roots of this mountain, on a perfect level, in an extensive calcareous District near the Village of *Kuwu*, is found a volcanic aperture, from which rise volumes of clay, mixed with salt water and accompanied by a considerable degree of heat.

The next mountains in a direct easterly course are very imperfectly known, they are called the mountains of *Willis*, and are situated nearly in the same latitude with the Marapi and Lawu; I mention them, at present, on the authority of others, reserving for my future travels the investigation of their nature and composition.

The mountain *Klute* is situated near the Eastern boundary of the provinces of the Princes of Java and of Government; it is the principal volcano of this part of the Island,—its projecting hills, in the Eastward, are united to those of the mountain *Kawi*—an extensive, nearly circularly disposed range of hills, extends from both in a Northern direction; these are jointly called the hills of *Endorawati*, and are of the nature of the secondary volcanoes.

The mountain of *Rejuno*, whose Southern foot extends to the hills of Endorowati, is situated near the North side of the Island, covering part of the provinces of Surabaia, Bangil and Pasuruan, while its Western foot extends to the District of Jipang of the Sultan of Java. The Northern hills of the Rejuno are united to the Gunung *Pengang-goong-ang*, situated in the District of Bangil.

The mountain of *Kawi* is situated in the same latitude with the Klute, and continues the great series in the interior of the Island.

Nearly one degree to the Eastward of the top of the mountain Klute we meet the mountain *Smiro* or *Somiro*, forming the boundary between the provinces of Malang and La-majang. This mountain is united the North to the range of hills jointly called the hills of *Teng'gar*, which contain a very extensive crater called the *Dassar* —the projecting hills of the Teng'gar in the North, extend to the vicinity of the Sea coast, while the Southern foot of the Smiro projects into the Soutern ocean.

The mountain of *Lamungan* carries on the great chain of volcanoes in the East; its foot is united to a range of secondary volcanoes

which runs transversely through the Island from North to South: the most elevated central top is called the mountain of *Iyan*, forming the boundary between the Districts La majang and Pugar—the Northern extremity runs abruptly into the Sea, a few miles to the Eastward of Bisuki.

The Gunung *Ring-git*, which continues the great series near the North side of the Island, is situated almost directly South of the capital of Panarukan. After an intermediate space of nearly half a degree, the direct series is carried on in the center of the Island by the mountain *Rowng*, forming the boundary between the Districts of Blambangan and Pugar. This mountain extends a considerable distance across the Island, and is united in the East by intervening secondary ridges with the mountain of *Ijen*, which terminates the great volcanic series in the center of the island, and consists of several separate tops.

In the farthest North-East extremity, stands the mountain *Talaga wurung*, in contact with the ocean, nearly in the same latitude with the Gunung Ring-git.

The several mountains of the large series of volcanoes just enumerated, though individually different from each other in external figure, agree in the general attribute of volcanoes, a broad base gradually verging towards the top in form of a cone. They all rise (comparatively speaking) from a plain which is not very much elevated above the level of the ocean. If we except very few, where the bases of two are accidentally united by the proximity of their situation, each individually must be considered as a separate

mountain, that has been raised by a cause independent of that which produced the others.

The conical figure of some of the mountains is completely regular, others have proportionally a very broad base, and incline in the ascent very moderately, some have an irregular top, or prominent inequalities along their sides, but their particular form will be pointed out in the subsequent remarks.

The general direction of the whole range is in a straight line longitudinally through the Island from West to East; it occupies scarcely two degrees in latitude. A right line drawn from the farthest peak in the East, to the extremity of the series in the West, or from the top of the Ijen to the mountain of Bantam, touches most of the primary volcanoes or their immediate environs.

It is remarkable that the same direction from West to East, nearly in the same degree of latitude, is carried on to the Eastward of Java, through the Islands of Bali, Lombok, Sumbawa, Flores, and several others of less extent still further to the East. Probably these Islands have the same constitution. Bali is certainly known to contain numerous volcanoes; one of them lately had a violent explosion.

Most of the volcanoes of the large series have been formed at a very distant period, and are covered by the vegetation of many ages, but the indications and remains of their former eruption still continue in the most evident degree.

The craters of several are completely extinct, those of others contain small apertures which continually discharging sulphureous vapours or smoke, indicate their present connection with

the causes acting below. Those which have had eruptions during the last 30 years will be particularly pointed out and the period mentioned.

They all have in general the same construction, they are made up of ridges arising at the top and descending the sides, broader at the base, with a narrow point or back; as they approach the foot of the mountain they spread and take a more winding or curved course.

They are bounded on both sides by vallies whose sides are gradually inclining or very steep; large rocks of Basaltes project from them, and in several instances they form the beds of rivers arising towards the top of the volcanoes.

In the rainy season they all convey large volumes of water, and are the cause of the sudden rise of the rivers in mountainous situations.

The *secondary mountains*, though evidently of a volcanic nature, differ, in many particulars of their constitution, from the individuals of the large series. They generally extend in long narrow ridges, with but a moderate elevation, and their sides ar less regularly composed of the descending streams above mentioned.

A more minute examination in most, shews a stratified structure and a submarine origin. They are generally covered with large rocks of Basaltes, and in some instances they consist of wacken and of Basaltic-Hoonblende, which is found along their base in immense piles. Their particular structure will appear from several which will be described in the sequel.

§ *II. Concise Mineralogical Account of the Island from its western extremity to the mountain of Sumbing, situated near the longitude of Samarang.*

The volcanic series begins in the west with the *Mountain of Bantam*, which I have placed here from its analogy to the others in form and disposition, as my researches have hitherto not extended to the westward of Batavia.

The *Salak*, and the *Gunung Gedé* and *Pangerango*, whose declivities are united at their bases, have during a long period of time had no violent eruptions, as appears from the excessive progress of vegetation on their sides—the descents of the Pangerango in particular are covered with a very deep black vegetable mould. To the Salak is united, in the South-west, a smaller volcano called the *Gunung Gagak*, whose top contains an excavation from which the inhabitants of the adjacent districts bring occasionally small quantities of impure Sulphur.

The ancient Crater of the Gunung Gedé is situated in the South-west side of the Mountain at no great distance from its top. It has of late years been several times visited; it likewise contains impure Sulphur, and sends forth occasionally volumes of smoke from various apertures. In the year 1761 it threw out a quantity of light volcanic ashes, which covered the surrounding territories to the depth of nearly two inches.

One of the ridges of the Pangerango, descending in the North-east, is called the *Mégémendung*; it is notable in consequence of a mine which was opened here in the year 1744, for the search of Gold, but which was deserted on ac-

count of the poverty of the ore (according to an account in the Transactions of the Batavian Society, vol. I)

That extensive tract of country which is situated between the foot of these two volcanoes, and of the others which continue the series to the boundary of Cheribon (containing the Southern portion of the districts of Chi-anchor of Kandang-wissi and Suka-pura) consists chiefly of secondary volcanic ridges.—Near the shore, and at some distance in the interior, are found calcareous hills and calcareous rocks in large piles.

The course of the rivers often disply Breccias in immense masses—in some of these are likewise found Silicious Stones of different kinds, as Agates, Chalcedony, Obsidian, Jasper, &c. also quartz in the form of Rock-crystals, Prase and Amethyst,—Porphyry exists in blocks of considerable size.

Near the foot of the Mountains Pangerango and Salak, both in the South and North, the only stone found on the surface of the ground is Basalt in small fragments, and smaller or larger lumps of Lava.

In the beds of the rivers also are strewed fragments of Lava, and larger rocks of Basalt project from the vallies in which they flow.

The roots of the Gunung Gedé extend to the Eastward till they meet the two mountains which continue the double chain of volcanoes in this part of the Island, the *Buang-rang* in the North, the *Baduwa* in the South.

I shall first detail the remarks I made on the Northern branch—At a small distance to the Eastward of the Buang-rang (whose form and neighbourhood sufficiently prove its volcanic

constitution) we meet the mountain called *Tankuban-praù.*

It has derived this name from its appearance at a distance, which resembles a *praù* or boat, turned up-side down.

This mountain forms a vast truncated cone: its base extends to a very great distance, and it belongs to the largest mountains of the Island.

I ascended it in the month of July 1804. After leaving the village of Chiratton, the road to the top leads through a thick forest of large and luxuriant trees, growing in an highly fertile and stimulating soil. The ascent is very gradual. This mountain forms one of the most interesting volcanoes of the Island. Although it has had no violent eruption for many ages, as is evident from the progress of vegetation and from the depth of balck mould which covers its sides, its interior has continued in a state of uninterrupted activity.

The crater is one of the largest, perhaps the largest of the Island. It has, in general, the shape of a funnel, but its sides are very irregular. The brim or margin which bounds it at the top has also different degrees of elevation, rising and descending along the whole course of its circumference,

The perpendicular depth at the side where I descended (in the south) is at least 250 feet. In the west the margin rises considerably higher.

The regular circumference of the crater, I estimate one English mile and nearly an half.

The South side of the interior crater, near the top, is very steep: I found it impossible to descend without the assistance of ropes tied to the

shrubs at the margin; it consists here of small fragments of lava—about one third of its depth it becomes more oblique or inclining, and the lower part consists of large piles of rocks, through which the descending streams of water have excavated a windi g channel.

The East side descends gradually about one half of the depth, where it is terminated abruptly by a perpendicular pile of large rocks, which continues to the bottom. The North side is more gradually shelving than the others, and is partly covered with vegetation. The West side is one perpendicular pile of rocks.

The nucleus of the mountain consists of large masses of basaltes, in which the volcanic opening is situated; and the sides exhibit piles and strata of this stone in every possible variety of cofiguration. In some places the rocks have the appearance of a regular wall, which is suddenly diversified by large fragments, suspended apparently by a small base, and threatening to fall down every instant. Some times they rise in an oblique manner and appear to have been disposed by art; but I shall not attempt a minute description of the disposition of the rocks and the strata which form the internal walls of the crater, which without an accurate drawing would be tedious and scarcely intelligible. The surface of the rocks which line the interior of the crater is completely calcined, generally of a white colour, sometimes inclining to grey or yellow. In many places small fragments of lava adhere to and cover the rocks of basalt; these are of different sizes and of great variety of form and colour, but the most are calcined or burnt on the surface like the rocks themselves.

The different sides of the internal crater are excavated, in many places, by furrrows made by the descending water, which penetrate to a considerable depth, and expose more completely the interior basaltic composition.

The bottom of the crater has a diameter of 300 yards, but is not completely regular; its form depends on the gradual meeting of the sides below. Its surface is much diversified; it is strewed, like the sides, with immense blocks of basalt, the interstices between which are excavated, in a similar manner, by the streams of the descending water.

Near the centre, somewhat inclining to the West side it contains an irregularly oval lake or collection of water, whose greatest diameter is nearly one hundred yards; it dilates into several branches. The water is white, and exhibits truly the appearance of a lake of milk, boiling with a perpetual discharge of large bubbles, which rise with greatest force form the Eastern side. The heat is 112 degrees of Fahrenheit's scale: the apparent boiling arises from a constant developement of fixed air.

The water has a sulphureous odour, its taste is astringent, somewhat saline Shaken in a bottle, its explodes its fixed air with great violence. The sides of the lake to some distance are lined by a white aluminous earth, most impalpably fine and very loose, on which account it is very difficult to approach the water. In attempting to examine its temperature and to collect it for analysis, I sunk into the earth to a considerable distance, and found it necessary to dispose large fragments of basaltes before I was able to pass over it.

This earth consists of the clay (alumine) of the lavas, dissolved by the sulphureous steams, on the bottom of the crater. It is of the purest kind, and divided to a degree minute almost beyond conception. Large quantities have several times been thrown out of the ancient craters of the Island; one eruption of this substance occurred in the year 1761 from the mountain Gedè, as above mentioned It was considered as an eruption of *ashes.*

I was witnes to a similar eruption which occurred from the mountain of Klute in the month of June last year; the earth very much resembled ashes, and was so impalpably fine and light that the common breeze of the monsoon carried it from this mountain, situated in the longitude of Sourabaya, to Batavia and farther westward. It possessed the properties of the purest clay, and being mixed with water, became viscid and ductile.—It can easily be formed into vessels and, if procurable in large quantities, might usefully be employed in the arts. All its properties indicated sufficiently that it was the alumine of the lavas divided in an extreme degree by the causes above mentioned. The Javanese are not wholly unacquainted with the properties of this earth; it is a custom among Silver-smiths to collect the *ashes* thrown out by similar eruptions, for the purpose of making *moulds* for the finest works.

Towards the Eastern extremity of the lake are the remaining outlets of the subterraneous fires; they consist of several apertures, from which an uninterrupted discharge of sulphureous vapours takes place. Two of these are larger than the rest; they are several feet distant from

each other. The apertures are of an irregularly oblong form, and covered with crystals of impure sulphur, which form from the discharged vapours, and adhere to those incrustations of the aluminous earth, which have formed themselves in a great variety of configurarions (hollows, tubes, &c.) near the apertures. The vapours rush out with incredible force, with violent subterraneous noises, resembling the boiling of an immense cauldron in the bowels of the mountain. Their colour is white, like the concentrated vapours of boiling water.

The apertures cannot be approached without the greatest danger, as their true extent cannot be discovered: they are surrounded by incrustations of sulphur adhering to delicate laminæ of the aluminous earth, which are extremely brittle. The greatest diameter of the large opening is nearly twelve inches.

To give an adequate description of the interior of this crater would furnish matter for an able pen: the force of the impression is increased, perhaps, by the recollection of the danger which has been overcome in descending to the bottom. Every thing here contributes to fill the mind with the most awful satisfaction. It doubtless is one of the most grand and terrific scenes which nature affords, and in the present instance the extent of the crater, as well as the remains of the former explosions, afforded a view and enjoyment which it is not in my power to describe. The other mountains of the Northern branch, which bounds the plain of Bandong (the Bukit Tungil, the Bukit Jarrian and the Manglayang) deserve a nearer investigation. They are doubtless of a volcanic nature, as ap-

pears from the stones found near their roots, and the rivers along their sides frequently flow through strata of Breccia.

Of the mountains which compose the Southern series, but two have been examined with some attention. The Baduwa was visited about 25 years ago by *Noronha*, a Spanish traveller. On its top is a large crater, which, like that of the Tankuban-praù, contains several apertures that constantly discharge sulphureous vapours. I received this information from an intelligent old Sunda-Javan who accompanied Noronha on his travels. The mountain *Wyahan* gives rise to the large river of *Chi-taram*, which discharges itself by several mouths in the Regency of Crawang The mountains of Tilu, Malawar and Sumbung are but little known.

The Papandayang, situated in the Western part of the District of Cheribon, in the province of Suka-pura, was formerly one of the largest volcanoes of the Island, but the greatest part of it was swallowed up in the earth, after a short but very severe combustion in the year 1772.

The account which has remained of this event asserts. that near midnight between the 11th and 12th of August, there was observed about the mountain an uncommonly luminous cloud, by which it appeared to be completely enveloped. The inhabitants as well about the foot as on the declivities of the mountain, alarmed by this appearance, betook themselves to flight, but before they could all save themselves, the mountain began to give way and the greatest part of it actually *fell in* and disappeated in the earth. At the same a tremendous noise was heard resembling the discharge of the heaviest cannon.

immense quantities of volcanic substances which were thrown out at the same time, and spread in every direction, propagated the effects of the explosion through the space of many miles.

It is estimated that an extent of ground, of the mountain itself and its immediate environs, 15 miles long and full 6 miles broad, was by this commotion swallowed up in the bowels of the earth. Several persons, sent to examine the condition of the neighbourhood, made report, that they found it impossible to approach the mountain on account of the heat of the substances which covered its circumference, and which were piled on each other to the height of three feet, although this was the 24th of September, and thus full six weeks after the catastrophe. It is also mentioned that 40 villages, partly swallowed up by the ground and partly covered by the substances thrown out, were destroyed on this occasion, and that 2957 of the inhabitants perished. A proportionate number of cattle was also destroyed, and most of the plantations of Cotton, Indigo and Coffee in the adjacent districts were buried under the volcanic matter. The effects of this explosion are still very apparent on the remains of this volcano, but I defer an account of it till I have had an opportunity of making a more minute examination.

In proceeding from the Papandayang about a quarter of a degree to the North and somewhat to the West, we meet the *Gunung Guntur* at the Eastern extremity of the plain of Bandong.

This mountain is united in the North to the mountain Pulassari, and in the South to the mountain Putrie; both form part of one of the

secondary volcanic ridges extending nearly direct North and South. In this ridge the Gunung Guntur has been thrown up, at a period long subsequent to the origin of the ridge from which it arises, being evidently one of the volcanoes of later formation.

The whole of the Eastern part of the mountain is completely naked, and exposes to view in a striking manner the course of the lavas of the later eruptions: the top is a regular cone and covered with loose fragments of lava.

I shall give a very concise abstract of the observations on the mountain, and on the different streams of lava which have lately flowed from its crater. I could distinctly trace, from the base of the conical top, to the roots of the mountain, five different eruptions. The latest stream of lava which I examined (in 1804, the mountain has since had a later eruption) was thrown out in 1800. Its course along the top cannot be distinctly observed, being completely covered with sand and small fragments of lava, which generally rise towards the end of an eruption. At the place where the stream first appeared distinctly, it was about 5 yards broad and completely even on the surface; having proceeded about 20 yards further it gradually widened, and was formed into a connected stream higher in the middle, the sides tapering or inclining towards the top, forming a ridge with a pointed or sharp back. As the stream arrived at the foot of the mountain it spread more and more, and pursued its course to the Eastward about 600 yards over the adjacent country. Its greatest breadth from North to South is about 160 yards, and it terminates

abruptly by a rounded margin, consisting of large blocks of Lava piled upon each other, nearly perpendicularly, to the height of 15 to 20 feet.

This stream of lava, like all the others of later date which I have examined on this Island, does not consist of a connected mass of fluid lava united like a stream of melted metal, at leats on the surface where it is exposed to view. It is made up of seperate masses, which have an irregular, generally oblong or cubical, shape and lay upon each other as "loose disjointed clods," in an immense variety of disposition. In some of these fragments I think I could observe a tendency to assume the regular basaltic figure.

During its course down the steeps of the mountain, the stream, as has been observed, forms the long connected ridge (which has been discribed above in the account of the volcanoes as generally covering the sides) but having arrived at the foot and spreading more at large, these lumps of lava dispose themselves, in some instances, in plains bounded by deep vallies; now they rise to a considerable height, and form a steep perpendicular eminence; then again they are piled upon each other more gradually, and appear rising by steps and divisions—but to give an accurate description of the arrangement of these fragments of lava would be unnecessarily prolix, and would require, to be clearly understoond, a good drawing.

In different places the sulphureous vapours have forced their way through the interstices of the blocks of lava; the sides of their outlets

(whose form is very irregular) is covered with a white calcareous crust, and the heat is so great that small pieces of paper thrown into them are immediately singed.

This stream of lava is bounded in the North by another of the same nature and disposition, thrown out of the mountain (according to an estimate made from the commencement and progress of vegetation upon it) about 30 years ago: in its course along the sides of the mountain it forms the same pointed ridges above described. It affords a plain demonstration of the manner in which the surface of lava is decomposed and rendered fit for vegetation.

A third district of lava bounds the new stream first described in the South; it is more extensive than the others, and consists of several distinct regions, probably thrown out during one eruption (which appears to have been more violent than the others) but in successive periods shortly following each other. It extends farther to the Eastward than the others, and covers a great portion of the foot of the mountain; vegetation has already made considerable progress on it: in the vallies between the separate streams of lava are found not only plants but also small shrubs.

At one place, near the termination of this stream, the lava is piled up in two irregular ridges to the height of twenty feet: and at a small distance from its Eastern extremity, on a spot which has escaped the effects of the later eruptions, and is covered by a pleasant wood, are three different hot wells within the circumference of a quarter of a mile.

In the South this district of lava is bounded by a recent stream which appears to have been thrown out in 1800 (by the same eruption which produced the first mentioned stream). It differs from the others alone in the colour of its lava, which has a reddish hue: it is less considerable in extent than any of the others and cannot be traced far from the foot of the mountain.

The fifth stream of lava which I examined is still farther towards the South, and is one of the oldest which have been discharged from the Eastern part of the crater. Near the foot of the mountain vegetation has made greater progress than in any of the other districts of lava.

The colour of the recent lava of this mountain is jet-black or grey: one of the streams only has a reddish colour, Its texture is very loose and its fracture very porous; the smaller fragments have much the appearance of the scoriæ of a black-smith's forge; on being thrown against each other they emit a sound like two bricks coming into contact.

The interior-crater of this mountain, as it has remained after the eruption of 1800, is less interesting than the others which I have examined. Its shape is some what oval, the greatest diameter being about 100 yards. Its depth is not very considerable—its structure in general is similar to that of the Tankuban-praú. It has one remaining aperture, which discharges with great force hot sulphureous vapours.

The other mountains of the transverse ridge (which succeed the Papandayang and the Gunung Guntur) are the *Talaga-Bodas* and the *Gunung Kraga*.

The Talaga-Bodas is situated about half a degree to the eastward of the Gunung Guntur, in the District of Cheribon: the Kraga is placed somewhat farther North, in the District of Sumadang.

The Talaga-Bodas or *White Lake* has acquired its name from a collection of white water which occupies the extinguished crater on its top.

The *Gunung Kraga* is a long extended volcanic ridge, extending from the former monutain towards the Tampomas: its top contains an extinct crater, from which impure sulphur is brought by the inhabitants of the neigbourhood.

The general series of volcanoes is now carried on to the eastward by the mountain *Tampomas*, situated in the District of Sumadang. This mountain resembles, at a distance, a cone with a very broad base, and is completely covered with vegetation. It has the appearance of one of the most ancient volcanoes of the Island. The stones along its base and sides are more exclusively basaltic than those of any of the other volcanoes which I have examined, and the lava which covered its Southern declivities is resolved into a reddish, dry, sterile soil much less fit for the production and propagation of vegetables than the soil of most of the other volcanoes of the Island, which is a black stimulating vegetable mould; for instance that on the declivities of the Gunung Gedé, of the Papandayang, of the Gunung Guntur, and of most of the other principal mountains of the Island. The District of Sumadang, in the vicinity of this mountain, is from this cause much less productive than the adjoining Districts of

Parakan-munchang and Bandong. In the rivers and vallies surrounding this mountain I found in various places large masses of Breccia.

The Southern foot of the Tampomas bounds an extensive plain near the central parts of the Island, which is separated from the large plain of Bandong by the Gunung Guntur and its projecting roots. It is called the *Glung-gung* and is only diversified by slight elevations and hills.

It lies in the midst of the volcanoes of this part of the Island, being surrounded by the two mountains just mentioned (the *Gunung Guntur*, and *Tampomas*) the *Papandayang*, *Chi-koré* *Talaga-Bodas* and *Kraga*.

I here discovered, for the first time, a *Limestone district* in the central parts of the Island covering the general basis of lava and basalt.

During one of my excursions near the center of the Glung-gung, in the Chutak *Chi-lolohan*, I observed several large rocks very different in their from and appearance from the common rocks of the neighbouring districts. Upon a nearer examination, I found them to be calcareous and of a coralline origin. Their colour was grey or inclining to brown, their surface was very uneven, being excavated by the falling rain drops. The fracture indicates strongly their coralline production: they are made up of a contexture of cells and tubes, adhering together by means of thin laminæ of calcareous matter. In some places small shells are found on their surface: they are very brittle, and effervesce strongly with acids; some portions are white on their surface and resemble chalk.

On the elevation which contains these calcareous rocks are found a number of wells, the water of which is strongly impregnated with fixed air: its taste is very pungent, and indicates the presence of a large quantity of this gas. Mixed with sugar and wine, it effervesces with the same violence as the european Seltser water. The temperature of the wells is somewhat hotter than that of the water in the vicinity of this calcareous eminence; shaken in a bottle the water explodes with great force.

Its analysis, and a particular description of the fountains will be added separately.

On proceeding to the Eastward from the capital of Sumadang, I examined with particular attention the Eastern declivities of the Tampomas. The only kind of stone which is found on the surface, or which projects from the ground is basalt, generally with four sides. The fragments which are strewed on the ground, are mostly rounded at the angles, and bear the marks of attrition. The soil is equally barren, and of a yellow or reddish colour. The bed of the river Chi-pelles (between the capital of Sumadang and Jungiang) is a mass of Breccia, and large concretions of this stone are piled upon each other along the borders.

About a mile Eastward of Jugiang, near the foot of Tampomas: is a fountain of mineral water: out of a circular basin, about 2 feet in diameter, a column of water (equal to the diameter of the aperture) is thrown up with considerable force to the height of three feet: a noise resembling that of the boiling of a large kettle, accompanies the rising of the water, and this impulse acting from beneath is greater at intervals, when the column rises consi-

derably higher. The water is covered with froth, and discharges from its surface a subtle vapour. Its temperature is 104 degrees of Fahrenheit's scale.

The taste resembles that of the water of Glung-gung: it is agreably pungent, but less strongly impregnated with fixed air. Its analysis will be added separately: to the bottom of the basin adheres a light yellow (apparently ochreous) precipitation. The external aperture of the well is inclosed by a circular wall made of small fragments of basalt, but the water rises from a stratum of calcareous rocks; some of these are also found in its vicinity near the surface, resembling those of the Glung-gung. From another calcareous rock, at a small distance from this fountain, the water discharges itself out of a number of apertures, and of the same temperature.

A few miles to the Eastward of Jungiang, the roots of the Tampomas gradually lose themselves in the plain, which intervenes between this mountain and the next of the large series. This plain is united in the North to the alluvial district along the Northern shore of the Island. The river Chi-manok, which discharges itself by several outlets near Indra-Mayu, after having received several large branches, and the last by Karang-Sambong, passes through it.

At the village of Bongas (situated about 10 miles to the North-east of Karang-Sambong) I directed my route to the large mountain, in order to examine part of the hills along its foot called the hills of Pana-wangan, and several hot wells which are found near their borders; on approaching these hills, after a very gentle acclivity, covered entirely by calcareous stones I very soon came to the spot of the hot wells.

They are found on a gently inclining plain about 100 yards in circumference.

This plain is perfectly white, and on approaching it, it is perceived at some distance by a sulphureous vapour arising from the whole neighbourhood. The water springs from several apertures, but their temperatures are not equal; the hottest indicates the degree of 130 of Fahrenheit's scale. They all contain a very large quantity of calcareous earth in solution and suspension, which, coming into contact with the air, immediately separates, and adheres to the surrounding objects, or is precipitated to the ground. The branches of the shrubs in the vicinity are all enveloped by a stalactical incrustation.

The water from the different wells, gently descending the white calcareous plain, is collected in a rivulet below.

A large number of calcareous rocks are found in the vicinity of the plain: some are covered with elegant Crystals of calcareous spar, others have a Coralline appearance, and some have the fracture of Alabaster. On proceeding up the hills, immense irregular blocks of calcareous rocks are found strewed about in the vallies.

About 100 yards above this district are several wells of Naphtha or Petroleum. It rises in small plashes of water, about 12 or 18 inches in diameter, upon which it drives in black specks, emitting the peculiar odour of the Petroleum.

The earth in the circumference of these plashes is strongly impregnated with this oil: it is very tough, and from that immediately bounding apertures, the naphtha flows out on its be-

ing pressed—some portions exactly resemble Asphaltum. A considerable space of ground is occupied by these wells: the stones are all calcareous.

A few hundred yards above this spot the borders of the hills become very steep. I examined them to some extent. They are composed exclusively of calcareous stones. Several extensive stalactitic caves are found at no great distance above the wells: they exhibit the usual appearances of calcareous caves and vaults. The process of incrustation is continually going on: in some places deep perforations extend into the heart of the hills.

The mountain of Cheribon stands considerably to the North of the other volcanoes, and its promontories form the basis of a projection to the North, in this part of the Island, from which an extensive alluvial district extends, in a Western direction, to the promontories of the mountain of Bantam.

This Alluvial District takes in the provinces of Indra-Mayu, the Northern part of Sumadang, Pamanukan, Krawang, the Environs of Batavia, with the country extending South to the foot of the Gunung Gedé, and part of Bantam.

Between the roots of the volcanic ridge which bounds the plain of Bandong in the North, and the Sea, is an extensive calcareous ridge.

The *mountain* of *Cheribon*, commonly called by the natives Gunung *Cher mai*, has a nearly regular conical form, On its top is an extensive crater, which has several times been visited. Two late eruptions are recollected of this mountain.

The first occurred in the year 1772, about the time when the Papandayang fell in, and the other in the beginning of the year 1805; it is remarkable that both these eruptions were followed by a very severe pestilence in the lower districts of this Regency.

The Southern promontories of this mountain are different from those to the North above described. Immediately after leaving Kali-Tanjung (a small village on the Eastern foot of this mountain) the stones that are met with in the bed of the river and on the acclivities are of a volcanic nature. The basis of the hill of *Tanjakan Lampung* is Basaltes. On proceeding along the Southern declivities of the mountain, on the road to the village of *Ragawachana*, the same kind of stone is observed on the surface; in some places it is decomposing and gradually mixes with the surrounding soil.

The village of Ragawachana is situated above the foot of the large mountain, some-what elevated, nearly S. S. West of the capital. At a small distance from the main road, and about 2 miles in a Southern direction from this village, are found two hot wells. The temperature of the water is 120 degrees of Fahrenheit, the taste is nauseous; the chief component parts are lime, magnesia, a little seasalt, and fixed air.

The whole of the surrounding district and the declivities of the large mountain are covered with Basaltes, which particularly engaged my attention on account of the regularity of its form A great number of rocks project from the surface of the earth; some are elevated to the height of 10 or 12 feet, and have a diameter

of 4 or 5 feet; they are mostly four-sided—the fragments strewed on the ground often have 3 or 5 sides. This part of the mountain, and the hills extending towards the South, form part of the ancient or original basis of the Island. The hills to the South near the declivities are irregularly spread over a large tract of country; they are mostly rounded on the surface, and (as far as my observations extended) indicate a submarine origin.

The next mountain of the large series is situated near the centre of the Island, almost directly South of the capital of the Regency of Tagal. It is commonly called the *Mountain* of *Tagal*. It represents a cone with a broad base—a range of secondary volcanic hills, originating near the mountain of Cheribon, is united to its Western roots.

In the year 1772, when the effects of the subterraneous fires were almost generally felt over this part of the Island (witness the explosion of the Papandayang and the burning of the mountain of Cheribon) this mountain also had a severe eruption: since this period it has several times been observed to send forth volumes of smoke. I have not been able to learn that any person has ever ascended the mountain and examined the top.

Between the mountain of Tagal and that of *Sudoro*, situated nearly a degree further to the Eastward, in the same latitude, a considerable range of volcanic hills intervenes, several of which exhibit vestiges of late eruptions.

The eminence of *Rogge-jambangan*, in the district of Paccalongan, contains an extinct crater, (which the surveyor, Mr. *Cornelius*, visited in

the year 1790). A considerable quantity of impure sulphure still remains in it. In the district of *Karang-kobar*, situated in the province of Kadu, near the boundary of Banyu-masas, several volcanic hills are found, which lately had slight eruptions. One of these from the Gunung Pakereman was more violent than the rest; it was preceded by an earthquake; the neighbouring districts suffered considerably, several extensive portions of earth sunk away, and the River *Dolok*, passing near the volcanic opening, took a subterraneous course.

From the Gunung Sudoro, a secondary range of volcanic hills extends irregularly through the Northern provinces of the Island, till it loses itself in the ocean at the promontory of *Ujung Gunung*, or the extremity of hills. The first portion of this range, which arises from the roots of the mount Sudoro, extends nearly East and West, and is called the *Gunung Praù*, from its resemblance to that vessel. It is a long extended eminence, slightly rounded at the top, which, from its elevation, may be observed at a great distance; from this hill the transverse ridge takes a northerly direction, and passing the district of Batang, loses itself at the extremity of Ujung Gunung. The rocks that here project from its declivities, or are strewed along the shore, are Basaltic.

The *Gunung Sudoro* has frequently been observed to emit volumes of smoke, particularly in the rainy season or soon after it. It burnt more violently in that year, when the volcano of the Island of Banda had a severe eruption towards the latter end of the last century.

The roots of this mountain are united to those of the *Gunung Sumbeng*, which is situated but a few miles to the South-east; they are jointly distinguished, as has been remarked above, especially by mariners, by the name of the brothers; both have a nearly regular conical form—the top of the Sumbeng is somewhat broader and indented.

That extensive district which intervenes between the large volcanic series and the South-Sea from the boundary of Cheribon to the mouth of the River Upak at Manchingan will be the object of a particular investigation. I shall at present state only the most obvious appearances.

A large portion of it is low and sandy, several of the largest Rivers of the South side of the Island pass through. it. The Kali (river) *Upak* near the Eastern extremity, the River *Brossot* (formed by the Rivers *Ello* and *Progo*) and the *Adilango*, through the centre. From the mountains the Brothers, a nearly parallel transverse ridge of secondary volcanoes runs obliquely to the ocean, In its centre the River *Serayu* flows in a Southwest course. Between these ridges and the ocean and several extensive marshes (called *Rowos* by the Javanese) especially that of *Aya;* and near the ocean at *Karang-bollong* (as well as in many other parts of this district) are immense piles of calcareous rocks, with the well-known excavations in which a kind of Swallow (Hirundo esculenta,) forms the so-called *Bird's-Nests*.

(*To be continued.*)

Essay on the Geography, Mineralogy and Botany of the Western portion of the Territory of the Native Princes of Java.

ADDRESSED TO THE HONORABLE

THOMAS STAMFORD RAFFLES,

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By Dr. THOS. HORSFIELD.

SECTION I.

The following Essay contains the substance of the Geographical, Mineralogical and Botanical remarks made during a journey through the Western portion of the territory of the Native Princes of Java. It is not necessary for the present purpose to define with accuracy the extent of this territory: it is bounded in the West, the North and the East by the Honorable East India Company's possessions, and in the South by the Ocean. The two Princes are generally known by the titles of the Susuhunan and the Sultan: the capital of residence of the former is called *Surokerto* of the latter *Jokjokerto;* the principal subdivisions of that part of the Island which is occupied by their dominions, will be mentioned in the next section: the territory is divided between both, and in the division a principal object has been to allot to each an equal extent of ground and the same revenue.

I have premised, to the detail of the remarks on the subjects above mentioned, an extract of the journal kept during my route, for the purpose chiefly of elucidating the geographical descriptions: this will form the first section: the second comprizes the geographical remarks, the third those on mineralogy, and the fourth those on botany. I left Surakarta on the first of August.

August 2.—The road from Surakarta to Jokjokarta pervades the most cultivated portion of the antient Mattaram; the tract is, on the whole, level; after a small eminence near the remains of deserted Kartasura, it passes, into the declivities of the mountain Marapi, which is observed, nearly in a North-west direction, at the distance of about twelve miles. Strangers uniformly admire the surrounding scenery. The prospect is extensive and large: the uniformity of a country in a high state of cultivation is diversified by the huge cone of the Marapi, towards which the territory gradually rises, and by an extensive range of low hills which appear to meet the road in a Western direction. Numerous rivers and rivulets descending from the large mountain, cross the road: their current is rapid, and in their basins are found almost exclusively volcanic materials. They frequently swell after raine, so suddenly as to become dangerous to travellers; most of them are checked by the Southern hills, and being consequently diverted to the Eastward, fall into the large river of Solo: one principal stream only takes a direction Westward of the range of hills, and discharges itself into the Southern Ocean at Manchingan.

Beyond Jokjokarta the large road inclines more to the South, and gradually approaches the shore: I halted successively at *Bantul*, *Brossot* and *Kadilangu*, at each of which places a Chinese Collector of the Customs resides. European travellers through this part of the Island take their abode, almost necessarily, with these people, where they are, in most cases, received with hospitality. By the frequent travelling of persons on public business, through this part of the Island, Chinese inhabitants are in some degree accustomed to our habits, and it must be acknowledged that they cheerfully contribute what is in their power, to the comfort and convenience of travellers. The first thing which is presented to a stranger on his arrival is *tea*, which according to the custom of the Chinese is found in readiness at all hours of the day in their dwellings, even in the most distant parts of the Island: and from the quality of this article some estimate may usually be formed of the condition of the inhabitants. About the time of their ordinary meals, the traveller is always liberally supplied with the common food which serves for the family, but those articles of convenience and luxury to which Europeans are accustomed must be provided by himself: in exchange for the comfort or assistance he receives, he must generally submit to an interrogation from all the inhabitants of a dwelling; and these are often importunate and troublesome: The object of his journey is minutely enquired into, his baggage is reviewed with a curious attention, and every novel or uncommon object becomes the subject of particular disquisition;

If the traveller is a man of rank, his attendants and servants must expect to be interrogated and examined in his place.

On entering the compound of the Farmer of the Customs at Bantul, I observed about half a dozen large game-cocks under appropriate cages, whose constant clamour and cackling appeared te be pleasant and agreable to all the inhabitants of the house in the same degree in which it was annoying to me: I soon perceived that they were objects of particular attention and carefully fed at regular periods. Every person accustomed to the intercourse with the natives, whether in the interior or along the seacoast, knows that cock-fighting is one of their common diversions, and even where these animals are not kept for this purpose, several large cocks under spacious cages or rather baskets are constantly found arranged at certain distances around their compounds. It is probable that the Chinese have adopted this amusement from the Javanese, but I afterwards found it universal among them on the route though this part of the Island. In the vicinity of the capitals, the Chinese Farmers follow the mode of life of their inhabitants, and the dwellings are supplied with various articles of house-hold furniture, but in the distant farms, chairs and even tables are generally looked for in vain.

The dwelling of the former at Bantul, indicated some taste and neatness; being a native of the Island, of Chinese descent he has like many others of this description (who are denominated *peranakans*) imitated the customs and mode of life of Europeans. At Brossot a lodging-house, *passangrahan*—is provided for the

convenience of the traveller at some distanee from the dwelling of the farmer; it is in a pleasant situation, cleanly, and supplied with the various necessary articles of furniture, but at *Kadilangu* he must accomodate to the inconvenience and offence of a bambu shed, crowded with numerous Chinese inhabitants.

August 5.—At Kadilangu I left the common route along the southern shore, and proceeded in a north-western direction towards the interior; I crossed the large river of Bogo-wonto several miles above its discharge. A branch of the grand ranges of central Hills, here extends considerably to the south, and the river often winds near the foot of the most projecting points. I breakfasted at *Bubutan*, a small farm belonging to Kadilangu, and passed a Bazar, called *Jénnér* about 10 o'clock. Here I observed the principal points of the branches of Hills descending in this direction, to which the road very gradually approaches, on the route to Jonno, where I arrived about 2 o'clock.

Jonno is the most considerable mart for the various linens which are manufactured in considerable abundance in this part of Baggalen, and well known in the surrounding districts on account of the quantities which are here offered for sale at certain days in the week. The whole of this province is celebrated for its manufactery of Cotton; wherever the soil is favorable this article is cultivated, but much more is required than the country produces, and the dificiency is supplied by the neighbouring province of Banyu-mas. On my further route I frequently met transports of Cotton proceeding to the Bazar of Jonno. The trade in this ar-

ticle, whether raw or manufactured, is chiefly engrossed by the Chinese; and a number of them have permanent residencies at this and the neighbouring Bazars: Several of their dwellings at Jonno are built of brick, and resemble those of the more wealthy inhabitants at the capitals.

A branch of the river Bogo-wonto, the river *Jali*, passes through this Bazar, and during the rainy season the whole surrounding territory is completely inundated: the intercourse with the neighbouring villages is now carried on exclusively in small Prows or Canoes, and affords on Bazar days, a very pleasant and lively scene.

August 6.—Went on to *Weddî*, a considerable village and Bazar at the western extremity of Baggallén. About half way (from Jonno) the village of *Gebbang* is situated on a river of the same name, in the vicinity of which numetous plantations of Cotton are laid out; the course from Jonno to Weddî is nearly directly west. Between Gebbang and Weddî I met numerous traders returning to the capital with the linens purchased at the bazar of this day.

Weddî is, next to Jonno, the most considerable mart for linens in this Province; it belongs to Surakarta, while the former is attached to Jokjokarta. I observed during a walk in the afternoon, many of the female inhabitants carrying loads of red yarn, elegantly colored of a deep scarlet. It was brought to the farmer of the Customs for the stamp or licence required to offer it for sale at the bazar. This yarn is died by the Morinda Citrifolia, the *Bengkudu* of the Javanese, or by a distinct species of this genus which is cultivated as an under-shrub:

August 7.—On leaving Weddi I took again a southern course towards the road leading from the capital to Karang-bollong. After crossing the river of *Lerreng*, which at this time of the year is small and confined, but in the rainy season contributes principally to the inundation of the surrounding territory, I arrived at *Ngambal*, a small village and tract near the large road, and further westward observed *Banjur*, *Botshor*, and several other large villages. About noon I reached *Bedati*, a small farm, a dependency of Weddi.

August 8.—I proceeded on the large road, to *Patanaän*, and consequently to *Kaleng* and *Wetton:* the tract is nearly level, but on leaving Wetton one observes distinctly the transverse ranges of hills which contribute to form the peninsula projecting in this part of the Island. About noon I arrived at the river *Chiching-goleng*, which winds at the foot of the hills, and at the extremity, a few hundred yards South from the road, discharges itself into the Ocean. Several small villages are dispersed through the neighbourhood, the inhabitants of which assist the trave ller in crossing: the river is very eep and the sea beating in from the south, occasons at times considerable roughness; two or three small canoes are attached to each other by means of a raft of plaited bambu, on which the passengers and goods are conveyed across. On the opposite side the ascent is at once precipitous, and the constitution of the hill is found entirely different from the low tract through which the road has hitherto passed. After the first ascent and an oblique curve of about half a mile along the western slopes of the first ridge, one meets

in a valley, transmitting a small rivulet, the principal village on this peninsula, denominated *Karang-bollong*. From Surakarta to the river Chiching-goleng, the road passes, with few exceptions, through districts which are cultivated: a great proportion of these are low, and rice raised on inundated grounds, (*Padi-sawa*,) is the chief production. In some parts of Baggalen this grain is sowed on high grounds, elevated beyond the point that is inundated during the period of the rains, and in rotation with various other vegetables which are employed in the food of the natives: these are principally *Legumes* of various kinds, *Cucumbers* and other cucurbitaceous plants—*Roots* (Dioscoreæ, Convolvuli, &c.) and many others. Favourable situations produce *Kachang-china* (Arachis Hypogaea) Indian-corn and Cotton. But in many of the fields which I observed the soil is composed almost purely of clay, without any mixture of sand or mould, bursting widely during the hot season, and only accommodated to the production of one crop of rice, on the retirement of the inundation caused by the rains.

August. 9.—Was devoted to the examination of the hills in the neighbourhood, and to a visit to the caverns in which the Hirundo Esculenta builds her nests. These caverns are found, at intervals, along the whole of the southern coast, from Java Head to the extreme eastern point, but no part of the Island contains them of the same extent or so well supplied with inhabitants, the circumstance on which their productiveness depends. The object of my visit was to determine personally their mineralogical constitution, as my ideas had hitherto been formed alone

from the analogy of similar caverns in other parts of the Island, in which they are formed almost exclusively in calcareous rock; and it will be necessary, consequently, to modify a remark made in the first part of the mineralogical essay. In regard to the particular economy of this bird, his food, and the manner of constructing the Edible Nests, as well as substance which furnishes the mateials, much remains still to be ascertained.

The peninsula which here projects to the south beyond the common range of the coast in this part, consists of several successive ridges running parrallel, almost directly north and south, and terminating precipitously at the Ocean. At the extremity they are divided by numerous clefts or fissures, which penetrate into the body of the hills, and in many instances extend, with various windings, to a considerable distance. Their direction in general is vertical, the horizontal diameter being the smallest, and they are closed above by the same mineral substance which forms the body of the hill Many of these fissures are in contact with the Ocean, the water of which occupies the lower portions: in these cases the external openings have remained complete, while in more inland situations, the hills of which we may analogically suppose to be cleft in the same manner, the apertures have been closed by de-composing vegetables or minerals, and the fissures to which they lead are concealed.

The apertures of those caverns which are at he present period most productive in Bird's Nests, are situated at the bottom of precipices whose perpendicular height is between 50 and 100 fathoms: they are narrow, and have the

same vertical disposition as the caverns; the water of the Ocean enters and retires with the tide, beating violently against the rocks which compose them, and at certain periods, when the waters rise above the common standard, the access to the caverns, always difficult and dangerous, is entirely impracticable. When this occurs during the period of collecting the Nests, it proves a great annoyance to the natives who are employed in this business.

The collection of the Bired's Nests being a very hazardous office, is effected by the inhabitants of neighbouring hills, who are accustomed to it from their infancy. They are denominated *Tukans*, the general term, in Malay, of a person expert in any particular business, or exercising a profession. The descent to the external aperture is performed on a ladder of Rattan, resembling in some degree the Shronds of a ship, attached to a rock, tree, or other fixed substance from which it depends perpendicularly. Although the length is in several instances very considerable, the descent and the return, even to a person carrying a load, is considered a trifling enterprize in comparison with the gathering of the nests from the sides of a cave: for this purpose bridges, often of considerable length, are constructed of the entire runks of Bambu, which are placed together longitudinally and transversely, and fastened to each other by rattans; a support to the hand of the collector is afforded by a separate rattan, of a large size, extended parallel to the bridge, about half a man's height, and answering to the railing commonly employed as a support across a narrow or difficult passage. These bridges are attached

to the projecting Stones of the Cavern, and their judicious regulation and distribution is one of the most important and hazardous duties of the office of a Tukan. If a collector misses his hold, or if the bridge which he traverses separates or breaks, he is inevitably lost. No exertion of his fellows can save him; if in his fall he should escape the sides of the cave, the violent agitation of the ocean at the bottom would infallibly dash him against the rochs.

Having visited the Caverns in the immediate vicinity of Karang-bollong, I pursued my course in a Western direction, across the successive ranges of hills, to the south-west extremity of this peninsula: at the cavern of Nagassary the declivity was sufficiently gentle to enable me to descend to the bottom, to observe the external aperture distinctly, and to examine at leisure in contact with the ocean, the materials that compose the extremity of the hill. A large vertical section was here exposed, and exhibited very strikingly the disposition of the strata which I had previously traced at the surface. At certain periods, when the ocean in not much agitated, it is not difficult to descend to the entrance, from this pile of rocks where I observed it, which is descriptively by, the Javanese, the *Pagelaran* or outer-apartment of the cavern. The particular constitution of the rocks will be described in the Mineralogical account.

After a visit to *Jingkla*, I descended on the Western side of the Peninsula, into the plain near the Eastern boundary of the district of *Aya* A small Chinese Farm called *Jittis* is situated here, and a few inconsiderable villages are

dispersed. The rest of Aya, in this part, is a desert, overflowed during the rains, marshy at all periods, and rendered almost inaccessible by an excessive luxuriance of an useless and unprofitable vegetation. At the foot of the ridges a considerable river, called the *river of Aya*, discharges itself into the ocean, near which, about five miles inland, the village of *Pringtuttul* is situated, well known as the place of banishment of offenders or rank from the court of Surakarta, and particularly of such as have incurred the displeasure of the Sovereign, by real or supposed treasonable conduct. This village is situated in a large forest, surrounded by marshes, and in a high degree solitary and gloomy. I observed in the Inhabitants of the neighbouring district a mode of dress, which is not common in the more populous or polished districts: in place of the common habit or vestment, consisting of a broad strip of Linen, denominated *Sarong* or Long-cloth by the Malays they wrap a similar strip of Strawsack or *Karong* about their Loins, which gives them a disgusting and savage appearance, and their manners appeared to partake in some degree of the apparent ferocity of their dress. The carried on their conversation with an uncommon vociferation; but they deserve consideration both on account of the wildness of the district which they inhabit, and of the dangers and hazards to which those are exposed who inhabit the Hills and assist in collecting the produce of the caverns. They have a particular method of carrying their common iron utensils or hatchets, used in cutting trees and for various domestic purposes; these they place

in a square wooden sheath or rather box, suspended by a girth at the lower part of their backs, which produces a rattling noise in walking and moving; on the sculpture of this box they display the utmost of their skill; in several instances the fragments of a broken looking glass were employed to increase its beauty.

After my return to Karang-Bollong I visited several of the chief villages of this neighbourhood; they are in general small and dispersed through the Hills: they have no (or very confined) Rice-gronds, but are plentifully supplied with Cacoa-nut and other Fruit trees. The common domestic animals which serve for the food of the natives, Goats, Fowls, Ducks &c. are very cheap, and rice is abundantly supplied by the neighbouring districts of Baggalen. The name of Karang-Bollong is derived from an excavation or vault in the extremity of the hill, near the discharge of the river Chichinggoleng; this is mentioned in the subsequent sections. Abouth two miles Westward of the chief village, the ridges are intersected, at the ocean, by a considerable bay, denominated the Bay of Passir, near which *Wollo* and various other small villages are pleasantly situated.

Agust 14.—I continued my route directly north along the ridges which constitute this peninsula; I halted at *Rangka*, a small district belonging to Baggalen, completely level and covered with villages and rice-gronds.

Agust 15.—I made a diversion from the common road, and visited the principal village of the district of Roma, called *Jati-nogoro:* the tract is level and in a high state of culture, but not far to the northward the summits of the cen-

tral ranges are discerned. Hence I took a western course to Selondokko, a village near the northern confines of the district of Aya. Several miles beyond Jati-nogoro the road meets the hills descending from the numerous central ranges, and the environs of Selondokko are already very uneven and separated by a succession of ranges, gradually rising to the north, from the lower district of Aya, in which Pring tuttul and Doplang are, in a southern and southwestern direction, solitary hamlets. Through the neighbouring hills of Selondokko numerous small villages are dispersed, the inhabitants of which cultivate "*Cogos*" or mountain rice. The soil is a black mould and highly prolific. The improvement of this neighbourhood is progressive, and the population gradually increases.

August 16.—On the further route the unevenness of the territory increases; after passing several rivulets which take a southern course, I arrived at the foot of the hill *Chelenan*, the ascent of which is long and considerable: on the summit a fine prospect of the surrounding country is afforded; I noticed the direction of Pring-tuttul and Jittis, and the south-west extremity of the peninsula of Karang-bollong: according to the usual custom, a simple break-fast was here provided, in the native style, for our party, by the inhabitants of the surrounding villages, under the shade of several ancient Warringin trees, which afford a convenient and pleasant resting place to travellers; and the long-continued ascent, from both sides of the hill, renders the situation peculiarly desirable as a place of refreshment. The descent in the north is interrupted by repeated ravines; having passed

several, a wide prospect opens in the north: an extensive portion of the grand central valley displays the windings of the river Serayu, beyond which the ranges in the north are observed to rise towards the large Mountain of Tagal: as one proceeds in the descent, the situation of the capital of Banyu-mas is distinguished by a close forest of Cacoa-nut trees.—I arrived here about 12 o'clock.

In the immediate environs of the capital a considerable tract is appropriated to the support of the Tommong-gong or native governor of this province, while the greatest part of the revenue of the principal sub-divisions, which are mentioned in the next section, are yielded to the Sovereign. The share of the Tommong-gong amounts to about one-fift of the whole proceeds of the province; besides this each of the divisions has a particular native chief, who administers his respective district, but is subordinatie to the Tommong gong.

The capital of Banyu-mas is situated on the banks of the river Serayu, being regularly laid out and divided by broad roads, crossing each other at right angles, and bounded by a high fence of bambu, beyond which the dwellings of the inhabitants are disposed without order; each family has a particular allotment of ground or square which generally is surrounded by a separate enclosure. The dwellings of the Manteries and other principal inhabitants are only distinguished by the external gateway, being more conspicuous, and, in some cases, ornamented with rude sculpture. I could obtain no satisfactory information as to the number of inhabitants of th capital, or rather principal village; no accurate

enumeration has yet been made; according to a vague estimate it contains between 3 and 4000 Souls. The Chinese inhabitants live separately on the banks of the river, near the farmer of the customs. The name of the village and the whole province is said to be derived from a small rivulet, which pervades the southern portion, and unites to the Serayu near the part inhabited by the Chinese, denominated from time immemorial Kali or *Banyu-mas.*

August 20.—I left the chief village to visit the South-western districts of this province: my course was first in a southern direction. After passing the narrow plain which bounds the banks of the river, and is laid out into rice plantations, I crossed a branch of the central hills running off in a South-western direction, consisting of numerous smaller points aggregately called the hill of *Kali-weddi.*

This range, as well as that between Selondokko and the capital is covered with a luxuriant vegetation, differing from the wilderneess of the lower tracts; it furnished me with various new subjects which will be mentioned in a succeeding section. It likewise afforded an excellent opportunity of noting the gradual succession of various vegetables according to the point of elevation. At one of the southern declivities of the separate hills, almost the whole of the district of Aya was exhibited to view. The extent of coast from the peninsula of Karang-bollong to the hill Bedu-gangan was distinctly seen; the surf beating against the shore, appeared like a white band, and formed a highly pleasing spectacle. On leaving the range of Kali-weddi, one descends into the plain of Aya, which in this part is

not subject to long continued inundations and affords many situations fit for culture. I met with several villages near the banks of the Serayu, the curves of which often meet the road. I arrived at *Maos* at 2 o'clock P. M. here the state of cultivation grandually increases. *Penggalan*, whither I proceeded the next morning, is likewise a flourishing village, and the environs of *Adipollo*, *Adiridsho* and *Adirodsho*, are nearly in a complete state of culture, comprizing a very extensive tract, which is laid out into rice plantations, and on the whole favourably situated for an annual crop. This portion of Aya forms a pleasing contrast with the neighhourhood of *Jittis* in the east, and that towards Talachap in the west; but towards the acclivities of the ridges in the direction of Pringtuttul and Doplong, the territory is again covered with a wild, and, from its distance, unprofitable vegetation.

August 22.—I went on in the morning southerly to Bunton, situated near the Ocean at one of the former outlets of the river Serayu, which is now completely shut up. The discharge of the river is about one mile further westward. The passage across is effected in the same way as above mentioned at Chiching-goleng: the canoes or boats were larger; the raft of bambu, secured on two of these, had firmness enough to support several horses. Near the western banks two inconsiderable villages are situated, beyond which this part of Aya is a continued desert to *Tala-chap*, a small settlement, near the boundary of the Honorable Company's possessions under the Residency of Cheribon, opposite to the eastern extremity of a small

Island, distinguished among the natives by the name of *Nuso Brambang*, and by perversion generally called Nuso Kombangan. The road follows the direction of coast, and often comes out at the Ocean, affording a handsome prospect of the Island just mentioned in the west: vegetation is on the whole more diversified and interesting than in similar situations, and I collected several, subjects which will be mentioned in the botanical section. I arrived at Talachap about one o'clock. This neighbourhood contains now the remnant only of a once flourishing settlement: it has been nearly ruined by the repeated visits and depredations of the pirates, arriving (probably) from the Islands of *Linga*, *Riouw*, and several others near the southern extremity of the Peninsula of Malakka, well known for their nautical enterprizes. It is painful to observe, on the spots of the former villages, nothing but the indications of a more flourishing period. Extensive clusters of Cacoanut trees still remain, of others the decapitated stumps only exhibit signs of the wanton licentiousness of these adventurers. The frames of several of the principal houses are observed above the high grass with which the ruins of the villages are covered. During the last two years the settlement has again in a small degree revived, and several of the former inhabitants have returned: to this has chiefly contributed the security and protection which is afforded them in various ways by the British Government: not only by the establishment of a stockade or small fortification on the north-eastern point of Nuso-Brambang, commanding the entrance of the Strait which is formed between

this Island and the coast of Java, and leads to an extensive bay at the southern part of the district of Sukapura, called *Segoro-anakan*, but particularly by keeping in awe the pirates from the Islands above mentioned, and those Malay Princes who are in the habits of supporting them. The visits and enterprizes of the pirates were not confined to the neighbourhood of this settlement: by ascending the rivers which discharge themselves into the strait and bay, they proceeded to the center of the Island, Sukapura. Dayu-luhur, and Juruk-leggi were equally exposed to their invasions. Many of the inhabitants were carried off in slavery, or obliged to retire to places of greater safety, and the villages were plundered and destroyed.

The situation of Talachap, though pleasant and interesting on account of the prospect it affords to a temporary visitor, is by no means desirable as a permanent residence. The exhalations from extensive swamps which surround it, occasion remittent bilious fevers, which carry off many of the inhabitants: there is likewise a deficiency of rivers and rivulets of a moderate size, for the purpose of laying out rice-grounds cultivated by inundation. In the course of the following days I visited the remains of a former settlement at *Donan*, near the discharge of the river of Juruk-leggi, the Strait running towards Segoro-anakan, and an extensive range of the opposite coast of Nuso-Brambang. On the 24th, I returned to Adipollo.

Within the distance of three miles, the three principal villages of the district of Aya are situated; Adipollo, Adiridsho and Adirodsho. A

Island, distinguished among the natives by the name of *Nuso Brambang*, and by perversion generally called Nuso Kombangan. The road [illegible] often comes [illegible] rection as the Peninsula of Karang-bollong [illegible] constitution is likewise similar: it terminates precipitously at the Ocean, and contains a cavern which is inhabited, although sparingly, by the esculent swallow. The district of Aya is at present administered by two chiefs, under the superintendence of the Tommong-gong of the province, who have the title of Ingebey or Behi: one of these resides at Adipollo, the other at Adiridsho. I returned to the capital by the same road, and after the arrangement of my plants, and the completion of the outlines of various drawings, I prepared for an excursion in a different direction.

I crossed the river of Serayu near the dwelling of the Chinese farmer of the Customs at the capital, and went on directly north about three miles to the large village of *Suko-rodsho*, situated near the eastern boundary of that subdivision of the province which is denominated *Passir*. After a consid rable acclivity, about ¼ of a mile beyond the river, the tract is nearly level, rising very gradually towards the large Mountain of Tagal, situated north-west from this place at the distance of about 8 miles. The environs of Suko-rodsho are at present in a very flourishing situation; the villages are large and surrounded by extensive plantation: various ridges, connected to the central hills, appear at a distance; many of these have also been cleared for plantations of Mountain-Rice and Cotton. Numerous rivulets and rivers descending from the large Mountain irrigate this and the adja-

this Island and the coast of Java, and leads to an extensive bay at the southern part of the district of Sukapura, called *Segro-anakan*, but particularly [illegible] rises towards the north. The cultivation [illegible] the ranges in the south, beyond which [illegible] are dispersed; the chief of these, in a district of the same name, is *Juruk-leggi*.

September 8.—I proceeded in a western direction: the territory is cultivated in the same degree as that which I passed yesterday; two large rivers, besides numerous smaller streams, descending from the northern hills, afford a plentiful supply of water: about six miles westward of Purwo-kerto, the road gradually approaches the branches of the central ranges running out in this direction, and inclining, in the north, to the western declivities of the large Mountain of Tagal: from the foot of these hills to the westward, the degree of cultivation gradually dimmishes, and the tract becomes uneven, but a considerable settlement exists at Atshi-barang, where I arrived about noon.

Adshi-barang is a small district stretching westward to *Dayu luhur* which is situated at the furthest boundary of the possessions of the native Princes; this tract is rarely visited by the inhabitants of Banyu-mas and Adshi-barang; I could obtain little satisfactory information concerning it: it is described as being covered with forest, deficient in population, and almost inaccessible on account of the imperviousness of the roads.

The settlement of Adshi-barang is improving; the villages are chiefly laid out in the vallies between the ridges, which transmit nu-

merous rivulets. The stream of *Tiadshum* is the most considerable: it rises from the ridges west of the large Mountain, and receives in this district two branches, the *Datar* and *Kabung*, which are mentioned in the subsequent sections. In the immediate environs of Adshi-barang the hills are chiefly covered with long grass, and afford comparatively few objects to a botanist. The custom of setting fire to the vegetables when the dry season is completely established, during the months of July and August, destroys those objects which would be interesting; when it has been repeated several successive years, scarcelly a vestige of a tree or shrub remains, and extensive ridges are covered exclusively with the Allang Allang of the natives, the Andropogon Caricosum of Linnæus. The ridges are cleared in this manner both for the purpose of furnishing grounds for Mountain-Rice, Cotton and various other domestic plants, and to afford facilities for the chace: although useful and necessary, on the whole, it is frequently conducted with wantonness, and I have often regretted the indiscriminate destruction of those plants which are useful and ornamental to the districts, and would also have been desirable in the collections of a botanist. I pursued my researches on the borders of the rivulets, in order, as far as possible, to from a comparative estimate of the former vegetable productions of the ridges in this part of the Island.

September 11.—I returned to Purwo-kerto and the next day went on to the principal village of Probolingo.

Probolingo is situated directly east of Passir and enjoys the same productiveness of soil and

forwardness of culture: it rises very gradually in the north towards the large Mountain of Tagal, which, as well as the ranges in the east, supplies numerous considerable rivers and rivulets. Although gradually extending towards this Mountain, and considerably elevated above the environs of the capital, the original vegetation of these districts has been so completely destroyed by the progress of cultivation, that (after my return to the capital and the arrangement of my preceding collections) I determined on a separate visit to this Mountain, which has no other distinction among the natives than the *Gunung-gedè* or *large* Mountain. My route was again by Suko-rodsho and Purwo-kerto; here I went off directly north, and ascended very gradually to the district of *Kumutuk*, which has already very considerable elevation. This is best determined by the catalogue of plants here collected, to which I therefore refer at present; I devoted several days to the examination of the declivities of this Mountain, covered with a very prolific vegetation, and made large additions to my Herfarium. I ascended as far as the natives could be prevailed on to follow, immediately above Kumutuk the acclivity becomes very steep; the environs contain a few small villages. The summit of the Mountain is said to be inaccessible from this point, being surrounded by very deep ravines The Mineralogical constitution of the environs is, on the whole, the same as that of the declivities of the other principal Mountains of this Island.

On my route to Talachap, I noticed, on the ridges of Kali-weddi, numerous interesting vegetables; and their distance not being considera-

ble from the capital, I deferred the minute investigation to another opportunity, after my return from the wes ern divisions of the province; I therefore went again to the principal village on the southern declivities of these ranges, and during various leisurely excursious, collected from the hills which are still covered with the original stock of vegetables, many interesting objects: these are enumerated in the catalogue of plants, and among the trees and shrubs, many remain for future investigations.

When I first arrived at the capital of Banyumas, the Tommong-gong or native governor was still at the court of the Susuhunan, but his return not long after my arrival, towards the end of the month of Ramadan of the Arabs, uniformly denominated Puwasa by the Javanese, tended both to facilitate my researches in his districts, and to afford me an opportunity of noticing some peculiarities in the mode of life and the government of the natives in the distant provinces. To detail these would be foreign from my object at present: it is sufficient to observe that the life of a large proportion of the subjects of the native princes is divided into two periods—one portion is spent at the court or residence of the sovereign, and devoted to his service; during the other they are permitted to return to their homes, to cultivate their plantations, and to prepare for the next period of service at the capital. Persons of rank and distinction are attended by their wives and families; but among those of the lower order these are necessarily employed in cultivating those grounds which are allotted to their support. These periods are in genaral nearly equal; but

they depend, in a great measure, on the pleasure of the prince, and on the urgency of those duties he chooses to impose upon them at the capital.

The Tommong-gong had arrived about 8 days before the feast celebrated on the last day of the month of Ramadan. Having returned from one of my excursions on the evening immediately preceding that feast, I could not excuse myself from being present at the entertainment, which was, as customary, given after the more serious ceremonies of the festival had been gone trough. The numerous relations of the native governor, who are mostly employed in the various offices of this province, tended to give a greater degree of vivacity to the celebration than might be expected in a distant village: in every thing the customs of the capital were imitated, and under the idea of paying respect to the sovereign, the Tommong-gong received that abject reverence which contributed to give him the appearance of a prince. This is the case in all the distant provinces, and perfectly consistent with the Javanese Government or despotism; and even Ingebeys and Demangs exhibit, on these occasions, not a little parade.

In the course of my continuance in this province, the Tommong-gong was zealous to give me every assistance in the prosecution of my researches: travellers depend, in the districts of the native Princes, on the good wil of these people, altho' this is obtained by the recommendation of the prime minister at the court, and the mode of travelling necessarily followed in a country where the oriental and feudal customs prevail in their full extent, affords many instances of the dependence on the character of the

chiefs. Nothing can be obtained by a pecuniary emolument, unaccompanied by the order of a chief, and force has often occasioned a temporary desertion of the inhabitants.

In my return I followed, to Segalo, the large road leading from Banyu-mas to Surokerto; *Purwo-rejo* and *Gomuro* are, in the province of Banyu-mas, the principal villages on this road; the last belongs to the district of Banjar: *Kutto-waringin* is a considerable village at the eastern extremity of this district. Here I left the large road and went on in a northern direction, crossing the large river of Serayu a few miles before the influx of the Merawu. Between Gomurru and Kutto-waringin I had a favourable opportunity of taking the Mountain of Tagal, the Sundoro, and the Sumbing, into one point of view, and to determine their relative situation.

October 18.—I halted at the principal village of the District of Bandshar, near the foot of the ridge of hills which rises again to the North of the valley that transmits the large river: it is situated near the banks of the stream Merawu, above mentioned, and contains, according to estimate, about 1000 inhabitants. The roads passing through this village are broad and regular, resemb ing in their distribution these of the capital of this province. This village appears to be in a prosperous condition, the environs are fertile and well watered, and the cultivation is luxuriant.

In departing from the large road, my object was to investigate the extensive ridges which occupy this part of the Island, and to traverse a tract which promised a greater abundance and variety of vegetable productions than could be expected on the common route.

October 19.—I proceeded from Bandshar Northward: the road first inclines to one of the most considerable points of the central ranges the hill *Pawinian* (the situation of which is noted on the Map) and then passes between this and a very steep, conspicuous pile of perpendicular rocks, called *Gunung Lawet;* it consequently winds round the Northern declivities of the hill Pawinian, towards the Western extremity of which I entered the District of *Karang-Kobar*, and halted at the small village of *Pagger-pella.*

The District called Karang-kobar occupies a considerable portion of the central hills: these are here very multifarious, of very different extend and elevation, running into each other without exhibiting any regular distribution. Their general direction is from North East to South-West, which is also indicated by the course of the rivers. They are very instructive in a mineralogical point of view, and their constitution will be explained below. Travelling in these parts is by no means facilitated by the condition of the roads; a path, following the windings of the hills, generally leads from one village to another, but where the tract is cultivated, the traveller must find his way over the mounds which separate the rice fields. To any enquiries on this subject, the inhabitants coolly reply that roads would be of little use to them and not reward the trouble of making; and as there are no native chiefs of superior rank who travel trough this district, the influence of the separate Demangs, between whom this tract is divided in small portions, is insufficient to ex-

cite the whole population to the improvement of the roads. On this account, as well as to obtain more time for botanical and mineralogical researches, I went on only a few miles every day. After leaving Paggar-pella, my next halt was at Karrang-kobar, the chief village of this district, situated in a concavity, surrounded on all sides by small rounded hills. The climate here is cool; from the chief village of Bandshar, situated near the river Serayu, in the lowers part of the centre of the Island, the country gradually rises towards the North. The soil is fertile and produces abundantly, but the trade with the neighbouring districts is not considerable, on account of the distance of a market, the condition of the roads, and various other impediments.

October 21.—I went on to *Kali lunyar*, and the following day to *Nusupan*; both these villages belong to Karang-kobar: the gradual ascent of the territory continues on the whole route, and the numerous hills are in many parts covered with a great luxuriance of vegetation: my botanical collections were therefore increased every day. On the 23d, I proceeded to *Batur*, which is a separate district, at the Eastern extremity of Karang-kobar. It is well known on account of an extensive establishment of Chinese which is formed here: I found a large village, more regularly laid out than those of the Javanese, inhabited chiefly by persons of that nation. The dwelling of the chief was built in the usual stile of the Chinese, and the whole was surrounded [illegible] lar stockade or wooden barrier [illegible] the other dispersed solit[illegible]

has, at a distance, a peculiar appearance: all the house, are naked and exposed not being surrounded, and partially concealed, by clusters of Cocoa-nut and other fruit trees, as in the lower tracts. The climate of Batur is comparatively cold, and the inhabitants employ and require a suitable clothing. I observed many of the principal Chinese to wear jackets lined with the prepared fleeces of sheep, which during the morning, are very comfortable. The appearance of the inhabitants is ruddy and healthy. Europeans find the same clothing necessary which is employed during the winter in Europe. The Thermometer descended on the 26th of October to 53° of Fahrenheit's scale; but from the month of May to August, it is much colder. I observed, in the houses of the Javanese inhabiting the neighbouring villages, a large space covered with heaps of ashes near the centre: several large stones serve to support the logs of wood, which are kindled here in the night. This place like all the elevated parts of the Island, has a peculiar vegetation. Cocoa-nut trees, plantains, and the common fruit and domestic trees of the lower tracts are not found; in place of these, many European vegetables grow luxuriantly if planted, several are spontaneous, and evidently belong to the original stock of the vegetables of this Island; these will be pointed out in a subsequent section. A few have been accidentally introduced by seeds, mixed with the culinary seeds brought from other countries. The vegetable productions on this Island form an excellent indication of the height of particular districts, and a principal object in my botanical remarks has been to determine

with some accuracy the geography of our indigenous plants.

Immediately to the North of Batur is a steep hill, the Gunung *Ptarangan;* which has about 1000 feet perpendicular elevation above the level of the surrounding territory: to the South of this village the country is uneven, and the declivities descend chiefly in a direction from North-East to South-West, being divided by numerous ravines. Extensive tracts are covered here with plantations of Tobacco; this, with Indian-corn, is the chief object of culture: no rice is produced on account of the elevation of the tract. The Tobacco is exported chiefly to the maritime districts, and the Chinese here subsist by a small traffic with this article, for which they bring hither various requisites from the Northern provinces.

This neighbourhood was interesting to me not only for the purpose of bringing together a general collection of many vegetables of high situations, but also in a Mineralogical point of view. A considerable range of hills rises in the north above the surrounding level: one of these has already been mentioned; they follow on the whole the direction from West to East; several of the principal points are described in the Mineralogical section. A branch of the large volcanic chasm, which exists in the bowels of the earth, in this latitude, shews itself by several considerable outlets; a short distance west of the large Mountain Sundoro, we find the smaller ones of the Gunnng Praù, of the Pakerman and of the Roggo-sumbangan The Pakerman is situated within a few miles of Batur, and is well known in the neighbourhood, in ex-

quence of a singular volcanic phenomenon which occurred about 30 years ago, and will be described in the Mineralogical account of this district. The *Guwa-upas* is dreaded by the natives, and according to their account, resembles the Grotto del Cano near Naples; they could not be prevailed on to conduct me to this opening; it is situated at no great distance from the crater, which discovers itself by the discharge of volumes of smoke at intervals.

From Batur my course was eastward, inclining gently to the north, rising higher on the successive ranges of this part, and passing many of the separate points and ridges, and several very deep ravines. On the day of my departure from this village, *October 27th*, I halted at *Konang*, a small hamlet, surrounded by a circle of eminences, to the north of which rises a considerable point, well known to the natives by the name of *Gunung Diyeng*, and connected with the more elevated eastern point, which at a distance receives the denomination of Gunung *Praù* (from its resemblance to an inverted boat or proa) although at this spot its numerous points are distinguished by separate appellations.

A traveller here does not suppose himself to be in an equinoctial region; he perceives the air cold during the day, and possessing at night a degree of keenness, which, on suddenly arriving from the lower country, is even unpleasant; no Cacoa-nut or plantain trees are about the village; he finds himself surrounded by a new tribe of vegetable; he is invigorated, and capable of a degree of activity which appears incompatible with the nature of a hot climate. Severe bodily exercise is not fatiguing, but even

desireable, and necessary to procure a pleasant temperature of the body when not warmly clothed. In the foresrs, the trees are enveloped with long, shaggy, depending moss, as in the coldest countries in Europe. Only a few solitary birds enliven the air; these are of a peculiar kind, and never seen in the lower regions. Natives of other parts of the Island, suffer immensely when suddenly transferred to this neighbourhood: the half naked coolies are uniformly found in the night huddled together in groupes, and enjoying the heat and smoke of a few burning chips.

The ancient inhabitants of this Island, of whose history, religion and peculiarities all indications are now uncertain, appear to have delighted in this vicinity, as well as in similar situations at no great distance from the principal volcanoes. A *Chandi*, Temple or Tomb, was found near the foot of the eminence of the Diyeng, not far from a constantly smoking crater, surrounded by numerous *Re-jos* or images, most of which have been carried away or destroyed by the present inhabitants. In proceeding on my route, and commencing again the descent of the Mountain Praù, after having for several miles followed an eastern course from the village Konang, I met and afterwards pursued along the whole declivity, one of the most stupendous remains of the ancient inhabitants, which, in my opinion, is found on the Island. At no considerable distance from the summit of the Mountain, I observed a nearly regular slab, which I at first mistook for a fragment of the common Basaltes of the neighbourhood, but was informed by the natives, that it was the indication of an artificial work; I very soon met the commencement of a stair, construc-

ed of this kind of stone, and the lava of the vicinity, regularly chiseled and worked into oblong plates, conducting, from this spot, towards that part of the foot of the Mountain on which the declivity becomes less precipitous. My estimate concerning the perpendicular height along which this stair descends brings it very near to 1500 feet: at lower part it gradually runs off or passes into a pavement, constructed of the most regular slabs of Basaltes collected in the environs. This stair has not been preserved complete to the present period; the traces are frequently broken or obterated, by currents of water descending with impetuosity in accidental excavations, and the present road deviates in many places: but at intervals 3 or 4, and sometimes 10 and more steps are found nearly entire. The breadth of the steps is three feet; the stair through the whole extent was bounded by a small margin, rising at each side about a foot in heigh, regularly worked from the same materials.

On this descent I had an excellent opportunity to increase my collections of the plants of high situations: I found numerous ferns not previously noticed, and, with a large number of scrubs and trees uniform in places of the same elevation, several that were new. After a short halt at *Kayu-rangkang*, I proceeded to one of the principal villages of this district, denominated (like the whole tract) *Kali bebber*. From Kayu-rangkang, the descent is very gradual: it is divided by many ravines, which transmit rivulets, and give a great degree of productiveness to the soil. The situation is still considerably elevated, and the temperature cool. I crossed again near *Jawar*, a small Chinese

farm, the river Serayu, descending with a rapid course from the Northern ridges.

The copiousness of my collections on the descent of the mountain Praù made it necessary to halt several days at this place, to add the subjects to the Herbary and to complete the drawings. Kali-bebber terminates, in this part, the territory of the Native Princes, being bounded in the East by the district of Kadu: it comprizes in the North the greatest portion of the mountain Praù, extends in the West to Karangkobar and Segalo, and in the South to Ledog. It is less hilly and irregular than the districts I had previously passed, and appears to be on the whole well cultivated: but little attention is paid to the condition of the roads, and a traveller often finds it convenient to follow the beds of rivulets, and the mounds which separate the rice plantations.

At Kerteg, whither I went the 31st of October, I found a small village inhabited by Chinese, attached to the Farmer of the Customs; on the road I had passed the boundary between Kali-bebber and *Ledog*. The vicinity of this place to the two large Mountains of this part of the Island, the Sundoro and Sumbing, was convenient for determining their relative situation; the road Eastward from Kerteg passes gradually into the large valley by which they are separated, rising gradually towards *Redsho*, situated on the highest part, nearly equally distant from each.

This valley has a regular, almost uniform bottom of considerable breadth, from which the territory gradually rises to each Mountain, the sides being intersected by deep ravines.

Many of these give rise to rivers and rivulets; most of the principal streams of this part of the Island spring from these mountains; the *Bogowonto* and *Progo* flow in a Southern direction, the *Begalo* and *Serayu* follow a Western course in the central valley of the Island. The village of Re-jo is situated at the boundary of the districts of the Native Princes in this part; it has derived its name from several large stone images or *re-jos*, which are carefully preserved in the middle of the road in a small appropriate building, and receive tokens of veneration from the inhabitants and from occasional passengers. On leaving the broad valley between the two mountains above mentioned, an extensive prospect opens on the traveller, exhibiting, at one view, the lower portions of the province of *Kadu*, consisting of an infinite number of hills, thrown together without order, and resembling the agitated waves of the Ocean. On entering this tract the state of cultivation rapidly increases, in every direction large villages are indicated by immense assemblages of cocoa-nut trees; and extensive plantations of Rice, indian-corn, Tobacco, and almost every kind of vegetable serving for the common domestic economy and nourishment of the inhabitants, bound the prospect.

The traveller here finds his progress greatly facilitated; having traversed districts in which all conveniencies of passage are left to accident or appear to be intentionally neglected, he perceives, in the excellent condition of the roads, a careful attention to the means of intercourse between the various parts of this as well as

with the neighbouring districts: agreably to the state of the country the course of the rivers and rivulets is uniformly rapid, and substantial bridges, in place of the temporary rafts of bambu, employed in the districts of the Native Princes, afford a further proof of a wise administration.

Between *Jittis* and *Pakkiswing*, whither I proceeded on the 2d of November, the inequalities of the tract are less considerable than on the preceding route; about one mile West of the latter place I crossed the river Progo, flowing with a rapid stream from the North. The road soon approaches the Western foot of the *Marbabu*, and of a smaller mount called *Andong:* beyond the basin of the river *Ello* it gradually ascends, and traversing numerous ravines, reaches the more elevated declivities towards the top of the Marbabu; it here passes successively the villages of *Kamantran* and *Koppeng*, and consequently descends again through many intervening vallies to the Eastern foot. Leaving the usual route from *Koppeng* to *Salatiga*, I went on directly East, and met the high-road, leading from Samarang to the Capitals of the Native Princes, at *Kali-Gandu.* In the afternoon of the 4th of November I returned to Souracarta.

POSTSCRIPT.

List of proper names from the first Section of the Essay.

It is to be observed that the sound employed by the Javanese, in expressing the letters, has been followed as nearly as possible, viz.

Javanese	*English*
Ho,	H
No	N
Cho (or Tsho)	Ch
Ro	R
Ko	K
Do	D
To	T
So	S
Wo	W
Lo	L
Po	P

Ddo, has a peculiar sound, resembling a double *d*, which can only be properly expressed by a native: it is indicated by *dd*.

Jo (or Dsho) Joo	J
Yo	Y (consonant)
Nyo	Ny
Mo	M
Go	G
Bo	B

Tto, answers to the double *d*, and can only be expressed by a native; it may be indicated by *tt*.

Ngo	Ng

The vowels are uniformly sounded as follows:

a broad, as in h*a*ll
e (as a in common) as in b*e*t
i (as ee commonly) as in f*i*eld
o as in note
u broad, as in bl*u*e

The syllable which has a long protracted accent is marked with - as in Weddí; ⌣ indicates a very short enunciation, to throw the accent with more force, on the other syllable. This sign' simply denotes the accented syllable, as Kérto; C is *never* employed alone, as, in the numerous words where *e* follows, it would be undetermined whether to pronounce it hard or soft.

Kemadu	(Cemadu)
Kemiri	(Cemiri)
Keji	(Ceji, &c.)

Kendal, &c. &c. written with C, might be pronounced Semadu, Semiri, &c. K is sufficent for every purpose, not liable to mistake, and more consistent with the genius of the language.

LIST OF NAMES.

Sûro-kérto
Jókjo-kérto
Mattâram
Kérto-sûro
Marâpi
Marbâbu
Mauching-an
Kâdí-langu
Bûbutan
Jónno

Jâli
Wêddí
Bâggâlén
Géb-bang (or Gúb-bang)
Ngámbal
Bán-jur
Bó-chor
Pâtá-naän
Káleng,

Note.—The *e* in this, and in many other words, has a sound which most resembles the English *u*, as in us, ugly, &c. being obtuse, and intermediate between *o* and *u*: it is expressed or indicated by a particular mark, called *pepút*; in this manner by the Javanese, and something similar must therefore be adopted to express it. Kaleng might be written Kálêng, Kalêng, or Kalûng. It is one of the most common and familiar native vowels, and occurs incessantly in their language, as *Sêgé* or *Sûggó*, boiled Rice—Nassi of the Malays. *Assûm*, Tamarind, Assam of the Malays. *Bádûg*, a fermented liquor, &c. &c.

Wêttón
Chí-chíng-gôleng
Kâ-chang
Pág-ge-láran
Jíngkla
Jêttís or Júttís
Aya
Pring túttul
Rômo
Jâti-nogóro
Selon-dókko
Dòplang

Bányu-más
Sêráyu
Káli-wêddí
Ê̂dâ-gángan
Ma-ōs
Adi-póllo
Adi-rídjo (ri-jo)
Adi-ród-jo (ro-jo)
Tâlâ-chap
Chéribon
Nûso-brámbang
Nûso-kombángān
Malákka
Suka-pûra
Segóro-ânakan
Dayu-lúhur
Jûrug-leggi (or lûggi)
Suko-ród-jo or ró-jo
Púrwo-kérto
A-ji-bárang
Tiád-jum
Kâbung
Dâtar
Prôbo-ling-go
Gûnung-gëd-dì
Kumùtuk
Puwása
Bán-jar
Pùrwo-re-jo
Gomûru
Merâwu
Kùtto-waringin
Sundóro
Sùmbing
Pawï-nian
Lâwet

Karang-kôbar
Pàg-ger-péila
Kâli-lúnyar
Bàtur
Parán̄g-an
Rôgô-jambángan
Guwo-upas
Gunung-di-yeng
Chándi
Ré-jo
Ledóg
Kêrtég
Bêgálo
Kadú, better Kêddú

(N. B.—I am uncertain whether it is not written *Gúd-dú* by the natives, it is often thus pronounced.)

Pakis-wíring
Andong
Ello
Kamántran
Kóppeng
Kali-gándu.

SECTION II.

Concise Geographical Sketch.

The Western Division of the territory of the Native Princes consists principally of

Mattaram (the Western portion)
Baggalen
Banyu mas
Romo
Dayu-luhur
Merden
Lurung-tenga, Kerto-negoro, and several inconsiderable tracts.
Segalo
Karang-kokar
Ledog
Kali-bebber and
Gowong

A. In the Western portion of *Mattaram*, West of the Capital of Jokjokarta, the principal villages near the high-road, which are marked on the map with the corresponding numbers, are, (See the Index annexed)

Bantul
Bantul-karang
Bazar Tagal-layang
Brossot
Patallan
Kodemangan
Krettek
Karang-wuni
Kachubung-darat.

Kadilangu is situated on the Eastern banks of the river Bogo-wonto, which forms the boundary between the Mattaram and Baggalén. The largest river in Mattaram is the *Progo*, the principal branches of which will be mentioned in the next Section: it receives, near Brossot, a small branch from the West called Galur

The numerous hills which compose the Western part of Mataram are not comprized within the limits of this sketch; many separate ranges appear to descend from the Mountains Sumbing and Koripan, directing the course of the rivers of Progo and Bogo-wonto.

B. The province of Baggalén, not only in point of extent, but particularly in regard to the state of culture and population, is one of the principal districts under the administration of the Native Princes: although it contains no capital with an excessive population, a large number of considerable villages are scattered over its whole extent: these are in greatest proportion appropriated to the domestic services of the Princes, the "*Gladak*"—and are administered by a Tommong-gong from Sourakarta and from Jokjokarta. As it would swell the catalogue unnecessarily, I shall only enumerate the principal villages on the great Southern route to Karang-bollong, those on the route which I followed, and several of the principal sub-divisions, which have hitherto not been pointed out in the geographical sketches or the maps.

I. *Villages on the Southern Road.*

Wonno-rotto
Ngawu-awu

Tegges
Wollo
Wawar
Rowo
Telogo
Blengor
Benner
Ngambal
Banyar
Botshor
Perchuritan
Bedati
Patanaan
Kaleng
Wetton
Truntung
Klegen
Mungu

2. *Villages dispersed through the central portions of Baggalen.*

Jonno
Weddi,—two considerable Bazars which have been mentioned above.
Bubutan, a small Bazar.
Jenner, ditto.
Gebbang
Suren
Banyu-urib
Poppok
Punda
Brengkol
Plumbon
Gadungan
Lajir
Gessian

Kwangun
Tanjung
Pengilong

3. *a.* Near the Norhern boundary, and *b.* the Western extremity of this province, are to be noted.

a. *Samawung*, a considerable village, the residence of the Tommong-gong from Jokjokarta.

Seruni } small districts
Somalangu }
Ungarang
Selang

b. Rangka, a small district, containing numerous villages

Kutto-vinangon } large villages
Jerakka }

Most of these small tracts and villages (of the 3d divison) approach or are situated on the declivities of the central ranges, from which numerous rivulets and rivers have their origin. Bogo-wonto, the chief of Baggalen, has already been mentioned: *Lerreng* arises towards the Western extremity, flows through the centre of Baggalen, and receives the rivers.

a. *Jati*
b. *Gobbang*, and several others.

The other rivulets arising near the Western extremity of this province take a Western direction, and unite to the river Chiching-goleng, a considerable stream, which follows the direction of the ranges of Karang-bollong.

hinsula, the denomination of few is uniform and determinate among the natives: *Karang-kuda* has been pointed out on the map—at the termination of the Eastern ridge a cavern is found from which the settlement has derived the name of *Karrang-bollong*.

The rivulets arising from these ridges unite to the Chiching-goleng in the East, and to the river of Aya in the West.

The province of Banyu-mas occupies a very considerable portion of the territory of the Native Princes; it is bounded by the district of Segalo in the East, and by several of the subdivisions of the district of Cheribon in the West, stretching transversely from the southern Ocean to the declivities of the Mountain of Tagal. It is composed of the following subdivisions, viz.

a. Aya
b. Panjer
c. Passir
d. Probolingo, and
e. Banjar

exclusive of the environs of the capital. *Aya* commences at the peninsula of Karang-bollong in the East, and extends in the West to the river of Juruk-leggi, which discharges itself beyond the Eastern boundary of the Island Nuso-Brambang, occupying a length of coast of nearly thirty miles, its breadth is also considerable; the Northern portions comprize the declivities of the central ridges; near the shore it is low and marshy.

Its principal villages and settlements are near the southern Ocean, between the discharge of the river Serayu and the hill Bedagangan—here an

extensive tract is in a state of culture. The principal villages are:
Adipollo
Adiryo
Adirojo
Sawangan
Bunton
Karang-pandan
Winong.

To the Eastward of the hill Bedagangan only solitary villages are found dispersed through an extensive tract, the greatest portion of which is a marsh, or an inaccessible wilderness; those which deserve notice are:
Widoro-pajung
Jittis
Aya, and
Doplang.

On the route from the capital to this district we note
Wono-seppi
Maos
Kali-weddi
and various smaller villages dispersed through the neighbourhood; and
Penggalan

Towards the boundary of Romo we note:

Selondoko, and, near the Western extremity, the settlement (at the boundary of Cheribon) Talachap, with the adjoining small tracts of
Donan
Jojok and
Juruk leggi
which have severally been mentioned in the Journal.

b.) *Panjer*, the second sub-division of Banyu-mas, is somewhat removed to the Eastward from the other districts of which this province is composed: the district of Romo, which bounds it in the West, is as it were intruded between Panjer and Aya. The Southern part of Panjer is level and in a high state of cultivation; it is here bounded by the Baggalen. In the North it is hilly, and, like the other tracts on the central ranges, contains only a scanty popution.

Kabumen is one of the most considerable villages of this district.

c.) *Passir* is the most westerly of the divisions of Banyu-mas, and extends to Dayu-luhur and several tracts belonging to the Residency of Cheribon: in the North it is bounded by Lossari and Tagal, in the South by Aya, and in the East it is united to the following sub-division of this province: the Southern and Eastern portions have a gradually inclining situation, and are chiefly in a state of cultivation. In the West and North it is hilly, the culture and population is not considerable.

Suko-rojo and
Purwo-kerto

are two very considerable villages, at each of which a native chief *Behi*) resides, who is subordinate to the Tommong-gong who administers the province.

Aji-barang is a small tract near the western, and *Kumutuk* near the northern boundary of Passir; through all these numerous villages are dispersed, but only the principal have been noted on the map.

d.) *Probolingo*, the fourth sub division of Banyu-mas, has the same local constitution, and a similar state of cultivation; it is bounded in the north by Bobotsari, Kerto-negoro and Jianna, in the east by Banjer, and in the south, by that part of this province which is annexed to the environs of the capital. Its villages are very numerous. Probolingo, the chief, has alone been noted on the map.

e.) *Banjar*, the last sub-division of this province, is the most easterly in its situation; its form is on the whole oblong, and it stretches far from west to east. Its constitution is more diversified than that of Passir or Probolingo—it is, on the whole, uneven or mountainous, but many of its uneven districts are in a high state of cultivation: they are covered with a fertile soil and are well watered.

Banjar is bounded in the west by Probolingo, in the north by the Honorable Company's maritime districts Pamalang, Pakalongan, &c. in the east by Karang-kobar and Segalo, and in the south by Panjer and Merden. Among its numerous villages I shall only point out *Banjar* (the chief)

Winorong
Gumuru
Kutto-Waringin, and
Gunung-Raja

Besides the five districts above enumerated, the revenue of which is claimed almost exclusively by the Sovereign, a considerable portion is appropriated for the private revenue of the Tommong-gong, who administers the province.—It

comprizes the environs of the capital, a large village also denominated *Banyumas*, and a long narrow tract extending on both sides of the river Serayu, towards the small tract of *Lurung tenga* or *Kali-mendong*, which is here intruded between the divisions of Banyu-mas.

Besides the capital, where the Tommonggong resides, are chiefly to be noted the villages

Sama-gedé
Gomellera, and
Purwo rejo.

Among the *Mountains* and *Hills* of this province, the Mountain of Tagal, denominated by the natives *Gunung-Gedé*, or the *large* Mountain, and various branches of the central ranges, extending longitudinally through the whole of this division of the Island, deserve particular notice. The Mountain of Tagal stands at the boundary of this and the northern districts already mentioned, and its declivities constitute chiefly the sub-divisions of Passir and Probolingo: the central ranges are on the whole arranged in two divisions, one on the north, the other on the south side of the river Serayu, each consisting of numerous smaller links, which are often disposed in succession and nearly parallel to each other. Besides this several ridges (arising near the western declivities of the Mountain of Tagal) extend through Aji-barang, Dayu-luhur, &c. towards the southern shore, meeting and uniting with the termination of the central ranges, which, to the west of the capital of Banyu-mas, also incline suddenly towards the south.

The names of all the separate points which were ascertained with accuracy are mentioned in the next Section, to which I therefore refer at present.

It may be proper, in this place, to enumerate in succession, the principal rivers of this part of the Island; several of these have already been mentioned; and, with few exceptions, they arise in, or pass through a part of the province of Banyu-mas. The river *Progo* alone, is entirely distant: the river *Bogo-wonto* (forming the boundary between Mataram and Baggalen) receives a principal branch of the river *Lerreng*, which arises near the Western boundary of the district Panjer. Several of the principal branches of the river *Chiching-goleng* arise from Panjer, and from the Eastern extremity of Aya. The *River of Aya* receives its sources from various branches, exclusively from the province of Banyu-mas; their direction is pointed out on the map; the branches from *Pring-tuttul*, *Selondoko* and *Cheleman* are the chief; they unite in the lower part of the district of Aya, and then follow the direction of the ranges of Karrang-bollong to their discharge into the Ocean, Another principal river of the tract of Aya flows into the Ocean at the Western foot of the hill Bedagangan: it is called the river of *Adirojo*, and has two principal branches, one from *Doplong*, another from *Kaliwedci*, which receive many small rivulets from the Northern hills of Aya, and contribute to innudate this tract.

Following the coast to the Westward, we meet, about five miles from Adi-rojo, the outlet of the river *Serayu*; this is one of the largest

streams of this Island; its source is near the North-western declivities of the Mountain Sundoro, from the hill Jajar (inclining to the Northern parts of the Mountain Praù) its course is first from North to South, having passed the districts of Kali bebber, Ledog and Segalo, it enters the province of Banyu-mas, through which it flows to the Ocean. Soon after arriving in Ledog it turns to the Westward, and continues in this direction till beyond the capital, and then inclines South to its discharge. It follows, on the whole, the direction of the large central valley in this part of the Island, which is confined in the North and South by the ranges of the central hills above mentioned. The Eastern branches will be mentioned in the sequel; soon after its arrival in this province, it receives the *Merawu*, a large river from the North, and subsequently the rivulets of

Blimbing
Mendong
Sapi
Deris, and
Piosso, from the South.

In this part of its course no considerable branch enters from the North, till the river of *Klawing*, which unites to it near Soma-gedé, carrying down the waters of numerous streams from the Northern ranges, and from the mountain of Tagal. Besides various other branches the river Klawing receives the

Gintung
Kelahan
Tambra
Pekachangan,

and, near its union with the Serayu. the River *Pellus*, which traverses the Eastern parts of Passir, and receives many subordinate streams, among others the

Bellud
Bakkal
Benner, and
Bagur.

Another large branch from the North unites the various rivers and rivulets of the central portion of Passir, which, as well as those flowing into the river Pellus, have their source from the declivities of the mountain of Tagal; it is called *Lo-gowok*, a principal branch is the river *Banjaran*, nearly of equal size; both receive numerous rivulets in the higher districts, of which the names were not ascertained with accuracy. The Lo-gowok falls into the Serayu, several miles West of the Capital.

The Western declivities of the mountain of Tagal, and the adjoining central Ranges in that direction, furnish three rivers which unite southward of Aji-barang: The *Datar* flows near the principal village of that District, the *Kawung* a few miles Westward, and still further in the same direction the *Tiaium*; the two former having united to the latter, it subsequently takes an Eastern direction, and meets the Serayu several miles to the South-West of the discharge of the river Lo-gowok.

Very near the mouth of the Serayu, it receives from the West a large branch, of no distant source, conveying the waters of the lower marshy districts, which accumulate at the Southern declivities of the central ranges: it is

denominated *Bengawang Brondong*, being broad and admitting the tide to a considerable distance.

Very near the Western boundary of this province we find the river Juruk leggi, which near its discharge resembles the Bengawang Brondong: it receives various branches from the districts of Dayu luhur and Cheribon.

f.) The district of *Dayu-luhur* is situated at the Western extremity of Banyu-mas, being bounded in the North Brebes, and in the West by several of the sub-divisions of the Regency of Cheribon; in the South it is united to the tract called *Jeruk-leggi:* from the information of the natives at Aji-barang, the greatest portion of it is in a state of wilderness, and many of the inhabitants of the Southern extremity have been carried off by the pirates, in former years, or have removed to situations of more security in Cheribon and Banyu mas.

At the Eastern extremity the province of Banyu-mas is united to *Karang-kobar*, *Segalo* and to the Northern portion of Baggalen: this parts of the Island is troughout a succession of hills and mountains, having on the whole a longitudinal direction, as far as regards the coasts.

g.) *Segalo* occupies the tracts on the North and the South side of the river of Serayu, rising in each direction by successive ascents and ridges towards Karang-kobar in the North, and the Northern ranges of Baggalen in the South; the face of the territory is very uneven, and the inequality is increased by the numerous rivulets poured into the Serayu from the ridges on each side. Its villages are numerous, only the fol-

lowing are noted on the Map—Segalo (the principal) and

Sawangan.

h.) *Karang-kobar* has on the whole the same constitution as Segalo, but rises more precipitously towards the Northern ranges; these are enumerated and described in the succeeding section, as well as the principal hills near the common route from Banjar to the north. Here the principal villages are

Telogo
Pagger-pella
Karang-kobar (the chif village)
Kali lunyar, and
Panusupan.

The small tract of *Batur*, situated on the declivities of the Northern ranges, intervenes here between Narang-kobar and the following district.

i.) *Kali bebber* commences at the summit of the Gunung-prow in the North, and stretches to the district of Ledog in the South: in the West it is bounded by Karang-kobar and Segalo, in the East by the Kadu. It is composed, in the North, of the declivities of the mountains Prow and Wismo, and in the East of those of the Sundoro: its central tracts have an unequal constitution, rising and descending like the waves of the Sea. The village *Konong* is situated near the declivities of the mountain *Diyeng*, and at considerable elevation on the mountain Prow; near the foot of the latter we meet Kayurangkang and Menjer; further to the south Blederan, Jawar, Kalibebber and numerous

others. More extensive than the last is the district of

j.) *Ledog*, stretching from the declivities of the Sundoro and Sumbing, to the central ranges of Baggalen and Gowong; in the West it is bounded by Segalo, and in the East by the Kadu. The face of the country resembles on the whole that of Segalo, but its ridges are less elevated and regular. Its principal villages are Ledog and Balle-kambang: besides these are to be noted

Selo-merto
Bo-merto
Selo-Kromo
Krassak and Gunung Tawong
Kerteg
Gondong
Banyu-smurub, and
Rejo.

k.) The district of *Selo-manek* or *Kali-wiro* was formerly united to Lebog, but was separated from it by one of the former Sultans of Jokjokarta: it is not considerable in extent or population.

All the rivers from these various districts flow towards the central valley, and unite to the Serayu. In the Karang-kobar district the chief river is the *Merawu*, already mentioned above, which rises near Batur from one of the highest points of the central ranges; it receives the *Kali-urang* (a considerable stream from mount Roggo-Jambangan) the *Teloito-suren* and *Panuraban*, which are marked on the map.

The water from the more eastern points of the central ranges unite to the river *Tulis*, two branches of which, the *Kali-puti* and *Dolog*, arise from the hill Pakerman.

The eastern points of the central ranges, and the declivities of the mountain Sundoro, in the district of Kali-bebber, supply the first sources of the river *Serayu*, which here receives, besides the river Tulis, various other rivulets from the declivities of the Sundoro and Sumbing. The river *Segalo* arises from the southern and western foot of the Sumbing; having received the river *Gung*, and many others from all directions, its course is west inclining to the north: it is now nearly equal to the Serayu in size, and both streams unite at Selo-kromo.

The mountains of Sundoro and Sumbing form the boundary, in this part, between the districts of the native Princes, Kali-bebber and Ledog, in the west, and those of the Hon. Company, the Kadu, &c. in the east. They will be mentioned in the next section, as well as the other hills and mountains of the western districts.

As the plan originally proposed has only embraced a very concise geographical sketch of the territory of the native Princes, I shall, in prosecuting the further route, enumerate only several of the principal villages (whose situation is marked on the map) and point out the northern branches of the river Progo, whose discharge is in the first district abovementioned.

On leaving the declivity between the two mountains Sundoro and Sumbing, near the boundary of the Kadu, we meet

Kledung
Telahab
Baponan

Jittis
Parakkan
Selo-korung
Geddu-siwur
Pakkis-wiring
Sechang
Bazar-grabag
Kamantrang
Ngablak } under the Residency of Samarang
Kopping }
Kali-gandu, on the large road from Salatiga to Souracarta.

The river of *Progo* consists of two principal branches: the western receives this denomination from its source; the eastern is called the *Ello*. The former arises near the mountain Ungarang and the rangen west of it: it receives the river *Gale* from the monntain Sundoro and the *Sarangan*, *Jampirosso* and *Lungi* from the declivities of the Sumbing, besides unmerous other rivulets from east and west. The river *Ello* rises considerably eastward, likewise from the declivities of the mountain Ungarang, and receives two large branches from the mountain Marbabu, the *Daru* and *Bollong:* its course is for many miles parallel to that of the Progo, and after receiving several streams from the Marbabu and Marapi, it winds somewhat abruptly to the west and unites to the Progo, in a direction nearly south-west of Magellan, the capital of the Kadu.

GEOGRAPHICAL INDEX

To the Numbers Marked on the Mineralogical Shetch.

No. 1 Bantul
2 Bantul-karang
3 Bazar Tagal-layang
4 River Progo
5 Brossot
6 Rivulet Galur
7 Patallan
8 District-Kachubung
9 Kade-mangan
10 Kachubung darat
11 Krettek
12 Karang-wuni
13 Kadilangu
14 River Bogowonto
15 Bubutan
16 Bazar Jenner
17 Jonno
18 River Jali
19 Gebbang
20 Semawung
21 Weddi
22 Somolangu
23 River Lerreng
24 Kutto-winangon
25 Selang
26 Wonno-Rotto
27 Ngawu-awu
28 Tegges
29 Wollo
30 Wawar
31 Rowo
32 Telogo
33 Blenyor
34 Benner
35 Ngambal
36 Banyur
37 Bochor
38 Perchuritan
39 Bedati
40 Patanaan
41 Kaleng
42 Wetton
43 Truntung
44 Klegen
45 Mungu
46 Guntur
47 Barang-mango
48 Suwu
49 River Chichinggoleng

50. Villlage Karang-bollong
51 Karang-bolong
52 Guwo-Dahar
53 Guwo-Gedè
54 Bay of Passir
55 Wollo
56 Poris
57 Hill Karang-kuda
58 Jeladri
59 Nagasari
60 Guwo-Nagasari
61 Village Jingkla
62 Guwo-Jingkla
63 Village Aya
64 River of Aya
65 Jettis
66 Widoro-Pajung
67 Pring-Tuttul
68 Jerakka
69 Adipollo
70 District of Rangka
71 Rogo-Donno
72 Rivulet Plemagan
73 Jati-Nogoro
74 District of Romo
75 District of Panjer
76 Kabumen
77 Rivulet Jju
78 Kranjingan
79 Selondokko
80 Rivulet Lebbeng
81 Hill-Chelenan
82 Banyu-mas
83 Rivulet Banyumas
84 Hill Wonno-Seppi
85 Hill Kali-weddi
86 Kali-weddi
87 Hill Winongan
88 Karang-anyar
89 Doplang
90 Maos
91 River Serayu
92 Peng-gallan
93 Adipollo
94 Adiryo
95 Village Adirojo
96 River Adirojo
97 Hill Bedagangan
98 Selok
99 Sawangan
100 Bunton
101 Karang-Pandan
102 Winong
103 Bangawang-brondong
104 Plerenan
105 Donan
106 River of Juruk-Leggi
107 Talachap
108 Jojok
109 Banjar
110 Karang-Pachi
111 Ujung-agung

112 Brambang
113 Karang-Bolo
114 Juruk-Leggi
115 Hill Pellem
116 District of Aya
117 Rivulet Bagor
118 Suko-Rojo
119 River Pellus
120 Rivulet Bakkal
121 Rivulet Benner
122 Purwo Kerto
123 River Banjaran
124 Village Karang-luwas
125 River Lo-Gowok
126 River Datar
127 Aji-barang
128 River Kabung
129 } River Tiajum
129 }
130 Passaran
131 Petuguran
132 Windu-aji
133 Kali-erang
134 Galu-timor
135 Mount Tagal
136 District of Kemutuk
137 Karang-anyar
138 River Bellod
139 District of Passir
140 District of Probolingo
141 Rivulet Kelagan
142 River Kelawing
143 Probolingo
144 River Gintung
145 Kerto-Negoro
146 Bobotsari
147 Jionna
148 Bechi
149 Sama-gedé
150 Rivulet Piosso
151 Rivulet Deres
152 Gemellem
153 Rivulet Sapi
154 Purwo-rejo
155 Bantar
156 Mendiraja or Lurung-tenga
157 Rivulet Mendong
158 District Merden
159 Rivulet Blimbing
160 Winorong
161 District of Banjar
162 Gemuru
163 Kutto-waringin
164 Legok
165 Cheng gawur
166 Banjar
167 River Merawu
168 Rivulet Winong
169 Mount Pawinian
170 Hill Lawet
171 Gunung Raja
172 River Urang
173 Telogo
174 Paggerpella
175 Hill Teloge-Teli

SECTION III.

Mineralogical Remarks.

The following remarks are in immediate connection with the Essay on the Mineralogy of the Western parts of this Island, contained in a preceding part of this volume. Since this was written several years have elapsed: it was my original intention to continue, without interruption, the Mineralogical Essay to the Eastern extremity; this intention has necessarily been changed, but a favourable opportunity has occurred of examining more minutely several districts, which are comprehended within the limits of the first part of the mineralogical description, and as I have been enabled to extend my remarks on various points, it has appeared desirable that the former omissions should be supplied, and that several errors should be rectified.

On the tract from Souracarta to the Southern declivities of the mountain Sumbing, I suspend all remarks at present, as I have determined to make it an object of careful investigation.

From Jokjokarta to the peninsula of Karangbollong, the tract, in a direction directly West from the capital, is low, and bounded in the North by the central ranges of hills, which are observed at intervals from the large road, which follows nearly the direction of the shore. Not far from this capital several eminences are scattered in a Western direction, the nearest of which, being completely calcareous, is denominated *lime* hill, or *Gunung-gamping* by the natives, as it supplies the whole neigbourhood

with this article; between Brossot and Kadilangu several hills descend towards the South, but the principal central ridges preserve a distance, varying from 10 to 15 miles, from the shore. The soil which covers this low tract is a mixture of clay and sand in various proportions; near the central range it consists chiefly of the former, and along the shore of the latter. Through the whole extent the shore is bounded by one or more ranges of low sand hills. From the river Bogo-wonto to the peninsula of Karang-bollong, this tract is annually inundated during the rainy season, by the waters brought down from the central ranges by the various branches of the rivers above mentioned, in the Geographical description. The intercourse between the different villages is now carried on chiefly by means of canoes or small boats; in the vicinity of shore the traveller passes conveniently over the more elevated sand hills; as the waters retire, the culture of rice is commenced, and most parts afford but a single annual crop. I have attempted to shew on the Map, the points at which the projections from the central ranges descend most towards the shore, and those which afford the broadest plain for cultivation. Only in few situations solitary fragments of Basaltes are observed, with rounded angles; the places where I passed the rivers of Progo and Bogowonto were at a considerable distance from the central ranges, but the beds were filled with volcanic stones carried down by the streamst.

Some peculiarities of the hills which compose the peninsula of Karang-bollong have already been mentioned in the journal: their direction is

from North to South, they terminate precipitously at the Ocean, and contain numerous perpendicular caverns. Having crossed the river of Chiching-goleng, the traveller meets at once the substance which forms the principal basis of these ridges; it is an aggregate rock, in its nature approaching most to that kind which is denominated by DeSassure *Poudingue*—Puddingstone—composed of fragments of various sizes, from very minute particles or grains of sand, to such as have six or more inches in diameter. They adhere very closely, but without any intervening cemen, in which they differ from the Amygdaloids of Werner, or from Porphyry to which, in other respects, they have great affinity. The constitution of this rock, one of the most common substances which forms the basis of the Island, is greatly diversified, and the following remarks apply only to the rock which composes this peninsula. It is found in some parts of the Island of a degree of compactness sufficient to enable it to take a polish and exhibits in other parts all the varieties of Volcanic or of Basaltic Tufa.

In the separate particles composing the aggregate rock in the ridges of Karang-bollong many of the varieties of Volcanic stone which are found on the Island, can be discoverd. The most universal is basaltes of various form, colour, size and composition; next to this are Lavas; some are made up chiefly of pumice, quartz and schorl, some can scarcely be distinguished from sand stone, in others numerous minute particles of schorl are bedded in white sand, which is agglutinated by means of a very pure white clay

in a state of partial decomposition. Green-stone, Hornblende and Osidian are also observed.

The external surface of this rock, especially where it is exposed to the action of water, is also greatly diversified, and often exhibits very grotesque figures: the minute particles of sand, &c. having gradually been carried away, the large fragments, projecting, form a very uneven surface. From the foot of the hill, at the common place of passing the Chiching-goleng, I traced it to the discharge of this river; here immense masses are heaped together, covering an extensive tract. At the termination of the hill several caves exist, and in one part a vault completely penetrates an extremity of one of the particular ridges. This is denominated Karang-bollong literally "*hollow rock*" and has given the name to the whole settlement. The vault here is very explanatory of the constitution of *the caverns in which the Edible Bird's-Nests are formed; on the whole it agrees with the rocks above described, but many of the separate fragments are of considerable size, exceding 6 or 8 inches in diameter: the largest of these are Basaltes. One of the Native chiefs, employed to superintend the collection of this production, accompanied me, and pointed out the similarity of Karang bollong, to the caverns in which the Bird's-Nests are constructed; this I afterwards had an opportunity of determining by personal observation. To the projecting fragments of the Pudding stone the cords are attached, which support the ladders and bridges employed in gathering the nests, and on this the collector

* Exp. Cat. No. 5 and 6.

must rely: accidents however are very uncommon; and although the rock is liable to decomposition, scarcely an instance is recollected at this place of the separation of the stone to which the cord was fixed.

I collected explanatory specimens of this rock both at the river Chiching-goleng, and at the cavern Karang-bollong, and the peculiarities of each will be pointed out in the explanatory catalogue which is attached to this Essay In the ascent of this hill (the first ridge of the peninsula pointed out on the map) the base of Pudding-stone is coverd by a deep soil, consisting of a mixture of clay and mould of decomposed vegetables: on the summit I noticed, at a spot where a section of the hill had been exposed in forming the road, a deep stratum of stone which was a precipitate or deposite from water.* The materials were the same with those that form the Poudingue just described, but they were differently arranged; they exhibited plainly the appearance of having been suspended in water and afterwards united into various forms; in this place the layer which was exposed had been subjected to a current during the period that the present arrangement took place; fragments of various forms were hurled together, and the surface was covered with a friable earthy crust, indicating a greater degree of decomposition than appeared on the fracture; and the present arrangement must have taken place after the first deposition or the first agglutination of the minute particles.

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* Exp. Cat No. 7.

Of the fragments composing this stratum some were nodular, consisting of various concentric layers; some were tebular; others seperated readily into parallelopipeds, trapezimus or pyramids: in many casses large irregular masses were agglutinated without any shape. A similar deposition from water is one of the most common consituent parts of many of the separate hills composing the grand central ranges: those observed on this route will be pointed out in their proper places, with reference to the explanatory specimens. The fracture was yellowish, and exhibited clay in which minute particles of quartz, schorl, &c. were bedded.

In ascending the second longitudinal range of this peninsula, I observed a deep yellowish soil from which large framents of Basaltes projected; the hill is steep, and several hundred feet above the level of the Ocean. At the Southern extremity is one of the principal Caverns inhabited by the esculent swallow, denominated by the natives *Guwo-Dahar.* The descent to the shore almost perpendicular, is 72 fathoms: the stones which were brought up to me consisted of rounded fragment of Basaltes,* arising from the decomposition of the Poudingues; these had been collected at the entrance of the cave. The fragments of Basaltes on the summit, in this place, were mostly large; the surface was in a state of decomposition, and covered with a yellow friable earth. Some of the smaller fragments were nodular, and consisted of concentric layers. According to the account of the persons employed in collecting the nests, the Cavern extends with

* Exp. Cat. No. 2.

various windings about 200 fathoms into the body of the hill; the breadth is not considerable, the perpendicular depth is about 10 fathoms and the sides are completely steep. It consists exclusively of the Pudding-stone above described, to which the swallows attach their nests. Above this Cavern several considerably elevated points project from the numerous ridges forming this peninsula, of which an extensive view is here afforded: their particular distribution is very irregular, and although the general direction of the assemblage is from North to South, many of the intermediate ridges stretch across the vallies from East to West. *Karang-Kuda* of the natives, which rises a little South-West of the village of Karang bollong, is here the most conspicuous point. It is composed of calcareous *rock, containing various admixtures, and highly diversified in the composition: the foreign parts appear to be chiefly siliceous, and according to the account of the inhabitants, render it unfit for the preparation of lime for domestic purposes. The fracture of some exhibits small shells, others are of a coralline constitution, the nitrous a cid causes on all a strong effervescence. At the point where the eminence of Karang-Kuda is united to the ridge containing the Cavern above mentioned, an extensive groupe or assemblage of siliceous rocks is found, consisting principally of Hornstone, containing Hyalite and Agate, and often passing into Hornstone,† Porphyry and Flint. The external surface, projecting beyond the earth, is often discolored,

* Exp. Cat. No. 3.

† Exp. Cat. No. 4.

appearing to be in a state of incipient decomposition. Some of the fragments partake of the nature of Hornblende, and these are also greatly diversified. This extensive groupe is in conjunction with the calcareous portion of the hill, the separate rocks penetrate deep into the earth; their relative position, in regard to the general Basis of this ridge, the Poudingue above described, I was not able to ascertain; but I afterwards found the same minerals in other parts of these hills, and the existence of extensive beds of siliceous stones, of almost every kind, in the grand central range and in the separate ridges deviating to the South, of which separate fragments are often carried down by the rivers, has been pointed out in the first section of the Mineralogical Essay.

The principal Cavern in the whole peninsula of Karang-bollong, is situated about one mile West of Guwo-dahar, in contact with the Ocean; from its size it is denominated *Guwogedé*, or the large Cavern: its height and transverse diameter are much greater than those of the Cavern abovementioned, but it does not extend so far into the hills. The perpendicular descent externally, from the eminence above the entrance at the ocean, is about 40 fathoms: its sides are also composed of rocks of Poudingue: several less considerable Caverns are found in the steep declivities towards the westward. Here I carefully noticed the termination of several ridges at the Ocean; they are perpendicular, or have a sudden inclination and the fragments of Basaltes, Sand, Lava and other volcanic materials are almost uniformly disposed in strata, the arrangement of which is more or less

perceptible. Westward of the large Cavern a considerable Bay exists in this part of the peninsula, called the bay of *Passir*; and the range is interrupted, in the north of the bay, by a sandy plain through which several villages are dispersed. From here I crossed the successive ridges towards the Western boundary, where likewise several extensive Caverns are situated on the Southern Ocean, the chief of which are those of *Nagassari* and *Jingkla*.

The constitution of all the successive ridges is similar to that of the first and second above described: in several places, where vertical sections of the hills were exposed, I noticed, stones of aqueous deposition, either in the place where they appear to have been formed, or carried by a current to a distance; the former separated spontaneously often from immense masses, of which entire ridges appear to be composed in the forms of cubes, rhombs, parallelopipeds &c. in the others fragments of varions forms were jumbled together, and the surface was uniformly covered with a friable earthy powder. The soil is in general deep, and blocks of Basaltes project from it, or are rolled together in the beds of the rivers. Approaching the village of Nagassari, deep strata of clay of a reddish colour are exposed on the sides of the hills. Above the *cave* of Nagassari the hill is composed of calcareous rocks, distributed in irregular groupes, or piled upon each other in masses, rising many feet almost perpendicular. The sides are steep and regular, or rounded, cellular and excavated. The composition is*

* Exp. Cat. No. 8.

more uniform than the Limestone of Karang-kuda, and the fracture exhibits numerous shells of various sizes; in some parts it is chrystallized and sparry: from this eminence the descent is on the whole gradual towards the Cavern of Nagassari: near the Ocean I found a vertical precipice of about 30 feet, to the rocks disposed near the entrance of the Cavern; this I descended on a common ladder of bambu. Here, on an extensive tract parallel to the ocean, immense rocks are scattered in every direction, resembling those of Karang-bollong: the entrance of the Cavern was distinctly observed about 20 feet lower, but at this time was inaccessible on account of the tempestuousness of the ocean, the surf beating against the rocks with great force: it was a simple fissure of about 10 feet perpendicular extent, gradually widening downwards.

A most extensive regularly perpendicular section of the hill was here exposed completely naked. The materials disposed in strata having a very gentle inclination, were similar to those composing the vault at Karang-bollong; Basaltes,* lava and sand, forming an aggregate rock of the nature of Poudingue; nuclei of white sand, schorl, and minute chrystals of quartz were sometimes discovered on the fracture. A considerable diversity existed in the form and colour of the Basaltic fragments, but they all exhibited the marks of having been carried by a current and of attrition. Many of the specimens here consisted of minute particles, greatly resembling the Basaltic Tufa, which I frequently found on

* Exp. Cat. No. 9.

the summits of the principal volcanoes, and of which the sides of the craters are chiefly composed.

The cave of Jingkla is situated near the South-west extremity of this Peninsula, in a ridge which is comparatively low, but terminates precipitously at the ocean and like the others appearing from above like irregular vaults penetrating the sides of the hill; these lead to a cavern less considerable than the others. In many other places which are here in view, the sides of the descending ridges are excavated to a considerable depth, where they are in contact with the Ocean. Near the shore I found detached *fragments of calcareous spar and of Hornstone mixed with the disintegrated parts of the poudingues. Descending the most western ridge of this Peninsula, I passed an extensive tract covered with rocks of limestone; they are highly irregular on the surface, and deeply furrowed or excavated; in many parts large rugged rocks impede the road, and occupy a considerable range at the foot of the hill in contact with the Ocean. In my return from the western declivities of this ridge I took a different route, and observed at intervals piles of limestone, poudingues entire or in a state of disintegrtion, fixed and rolled basaltic rocks, particularly in the basins of the rivers, and extensive beds of stones deposited from water.

The further remarks on the ridges which compose the Peninsula of Karang-bollong I shall suspend, till the other hills which have a similar constitution in the western portion of the Island,

* Exp. Cat. No. 12 and 13.

have been described, and till the separate objects *of Lithology have been illustrated by the explanatory Catalogue: although the materials composing the grand central ridges and their branches are similar, it will be proper to follow them in the order of my route, and to point out the peculiarities which were observed. After leaving Karang-bollong, I proceeded closely along the eastern foot of the peninsula; at the village Adipollo the natives produced the stone which is employed in burning lime: it is a Stalactites of a loose cellular texture, formed in the numerous vallies of these ridges from the general mass of limestone, containing foreign admixtures: the latter, when exposed to a strong degree of heat, according to the account of the inhabitants, crumbles to pieces and affords a gritty mass, which cannot be employed for any of the purposes of lime.

In many parts of this route I noticed steep piles of calcareous rocks, and irregular masses were distributed along the foot of the hills; the surface was very rugged. Rounded fragments occasionally projected from a deep soil, and in one place I found hornstone similar to that of Karang-Kuda. Great portion of this tract is inundated during the rainy season; and even in the middle of the dry season many spots, were marshy. The small tract of Ranka is situated towards the northern extremity of the ranges of Karang-bollong, and forms part of the extensive plain of Baggalen; in the north, the rising is scarcely perceptible; proceeding westward to the village of Selondokko, I passed the projec-

* Exp. Cat. No. 10 and 11.

tions of the numerous central ranges, and entered on an uneven tract: the ascent continues, with occasionally intervening vallies, to *Chelenan* the highest point on the large road to the capital of Banyu-mas; several rivulets intersect the road, in the beds of which are rounded masses of Basaltes and Lava. The soil is deep, and on the whole fruitful. I found the various ranges which I afterwards crossed from the capital to the southern foot of Kali-weddi, on the route towards Talachap, of the same constitution. Upon the whole, great uniformity is observed in the central and transverse ranges of this part of the Island. On all the soil is deep; and extensive masses of stone, formed by a deposition from water, with fragments of Basaltes rounded by attrition, are observed in most of them.

The lower tract of Aya, which is bounded in the north by the projections of the ranges just described, and along the course of the southern shore by several ridges of low sand hills, is subject, during several months of the year, to the same inundation which takes place in the province of Baggalen eastward of the peninsula of Karang-bollong; but the greatest part of Aya is still in a state of nature, and its swamps are covered with impenetrable clusters of thorny-bambu (Pring-ori) various species of Erithrinaa, Mimosa, Ficus, Vitex, Eugenia, and other forest-trees, which from their distant situation are rarely applicable to any use.

From the southern declivities of the hills of Kali-weddi to the principal settlement of Aya (Adipollo, Adirijo, &c.) the road frequently meets the curves at the eastern banks of the large river of Serayu, the course of which is

now very slow; in the westward a range is perceived, which runs off, in a South-west direction, towards the Bay of Talachap. After crossing the river near its discharge, I proceeded nearly westward through a tract which is low and marshy: several bays and inlets introduce the water of the ocean, and it is covered abundantly with the common marine plants, viz: Rizophorae, Nipa, Hernandia, Tacca, &c.

This tract extends in the same direction to the district of Cheribon: several branches of the grand central ranges run here towards the shore, nearly from North to South, directing the course of the Rivers of Juruk-leggi, Chi-brum, &c. as they arrive in the lower alluvial districts they send off many transverse branches, which serve as canals to introduce the sea water through this whole tract, and give that disposition to the soil which is favourable to the production of the marine plants above mentioned.

The Island called by the natives *Nuso-Brambang*, extending from about one mile eastward of Talachap to the discharge of the river Chipakkat, is separated only by a narrow strait from the low tract of the opposite Island. This strait communicates in the west with an extensive Bay denominated Segoro-Anakan, and affords a discharge to the water accumulated by the Rivers of Juruk-leggi, Chi-brum, &c.

Nuso-Brambang rises in this part almost precipitously from the Ocean: its constitution is of a mixed nature, bearing great resemblance to the hills which compose the central ranges I examined it in contact with the Ocean from the deserted village of Banjar, towards the eastern extremity: the points are mentioned on

the Map, and on most I collected explanatory specimens (See the Map.)

At Banjar I noticed in the pebbles on the shore the following peculiarities:

Firstly—small fragments of very dense Basaltes, of a blueish color, resembling touchstone:

* *Secondly*—pebbles, the basis of which was Horublende, marked with numerous white lines, variously crossing each other, consisting of delicate laminæ of Feldspar, the lustre of which was lost by attrition; in some fragments, however, the laminæ were extensive and entire, and these, superficially viewed, resembled granite:

† *Thirdly*—a species of Sandstone which is peculiar to this part of the Island: the color is greenish, the grain very fine, and, in most of the fragments, a determinate form, consisting of four unequal sides, resembling exteriorly the common Basaltes of this neighbourhood, could be observed. Many fragments are cuboid, others rhomboid, &c. I am led to suppose that extensive beds of this stone enter into the composition of the hills in a western direction from hence: in the eastern ranges I have hitherto not observed it.

Fourthly—rounded fragments of Agate, Jasper, Hornstone, Porphyry and other siliceous stones.

In ascending the hill in this part, which rises nearly precipitously a few hundred yards from the shore, I found again numerous fragments of the greenish stone just mentioned: in the rivulets

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* Exp. Cat. No. 20.

† Exp. Cat. No. 17.

were detached basaltic fragments and rounded Poudingues of a close texture, consisting chiefly of Hornblende, in which were bedded nodules of Feldspar and Quartz: the basis of the hill itself, in this part, is a congeries of Basaltes,* which are occasionally observed on the surface; this is covered with a deep black mould in which vegetation is very prolific. No great progress appears at any period to have been made in culture; since this neighbourhood has been disturbed by pirates, an entire desertion of the population has taken place, and the fruit trees remaining on the spots of the former villages and settlements, grow up promiscuously among the other trees of the forest. From Banjar I followed the shore to the principal points situated in the East: at *Karang-pachi* (see the map) is a steep pile of calcareous rocks which extends, in different strata, a considerable distance along the shore: the surface is very† irregular, and marked with deep cylindrical excavations; the fracture is by no means uniform, and it appears to contain a considerable admixture of minute crystals of quartz. At *Ujung-agung*, which follows (a few hundred yards) farther Eastward, a different appearance is exhibited. A very extensive Groupe of Volcanic rocks, occupies a considerable extent of the coast declining gradually to the Ocean and then stretching to the Eastward; in the South it rises§ precipitously to the range which here composes the Island: it is a genuine lave, exhibiting the

* Exp. Cat. No. 19.

† Exp. Cat. No. 21.

§ Exp. Cat. No. 18.

character of this stone on the surface as well as in the fracture; but it differs from the others hitherto observed on the present route, in evidently remaining on the spot where it was formed, being, on the whole, connected to one mass, not rounded on the surface, or exhibiting blunt angles, as those referred to in the preceding description, both such as were found in the beds of rivers, or dispersed among Basaltic rocks through the hills. It appears, in my opinion, to come near to that species of lava which is distinguished very properly by Sir G. *Mackenzie* (see Travels in Iceland) by the name of *Cavernous* lava: I soon met it again in investigating the Southern coast, and it afterwards occurred, both in exposed situations, where it is acted on by the Ocean and in the midst of the central ranges.

It has appeared of importance to point out those minerals which remain in their original situation, and define the extent of the volcanic chasm in the bowels of the earth, as in most parts of the Island, although consisting almost exclusively of volcanic materials, these have been removed from the place where they were formed, and have been arranged in strata, often probably, at a great distance from the spot where they were acted upon the subterraneous cause. The constitution of the entire series of the irregular central ranges, is a proof of this, and after this mineralogical sketch of the route, I shall endeavour to point out (with reference to the map) these points which remain in their original state, and those which have been arranged in strata.

The external surface of this lava is rugged and cellular, the excavations are deep, and often confined by a narrow corresponding margin; it has a particular disposition to burst into irregular, rhomboidal, oblong or cubical masses, some of which are very large: the fracture of separate particles is observed to be compact or finely vesicular, and contains much Feldspar and occasionally Zeolites. The whole groupe must be reckoned to the class of submarine lavas.

The appearance they exhibit to view is very striking; an extensive field in contact with the Ocean is here covered by rugged lava, and although the groupe is highly irregular, the disposition to separate into rhombs and cubes is distinctly observed in the larger masses, which in alternate projections contribute to form a very irregular scene.

From Ujung-agung towards the furthest North-East point, I noticed, in contact with the Ocean, only calcareous rocks, excepting the pebbles on the strand, which were similar to those *of Banjar: at Brambang the piles are very †precipitous and the strata inclining: towards Karang-bollong near the point mentioned) the surface of the rocks is very unequal, cellular, and excavated with cylindrical furrows. I refer for their particular description to the explanatory Catalogue, see No. 17 to 24.

From the river Serayu in a direction Eastward to the foot of the hill Badagangan, the tract is level, and at the present period (in contact

* Exp. Cat. No. 22.

† Exp. Cat. No. 23.

with the Ocean) in a state of cultivation: the soil is a mixture of clay and sand, and produces annually a plentiful crop of rice: Cacoa-nut trees are very abundant. The river Adirojo flows along the Western foot of the hill mentioned; at its banks are exposed in many points, piles of Sandstone of a texture more or less compact, and often of a stratified disposition, resemb ing the stone called *padas* in many parts * of the Island, and belonging to the class of volcanic Tufa: on the Eastern banks of the river it is in conjunction with the rock of which the hill Bedagangan is composed: this has the same direction as the ranges of Karang-bollong, extending through the Southern parts of the plain of Aya, directly North and South, without any connection with the central ranges; its base in the parts I examined, is composed of cavernous lava, of submarine origin, and of constitution very similar to that found at the point Ujung-agung on Nuso-brambang. In con- † tact with this I noticed Pudding-stone of the same kind as that of Karang-bollong. This hill terminates precipitously at the ocean, and contains here a fissure which is inhabited by the Hirundo esculenta. Near the discharge of the river Adirojo a large tract consists again of cavernous lava, compact in its fracture, but highly rugged and irregular in the external appearance. Here extensive groupes project at low water, presenting rocks of a dark color, cellular, and excavated in great variety of form §

* Exp. Cat. No. 25.

† Exp Cat. No. 26.

§ Exp. Cat. No. 27.

The fracture resembles that of many of our Basaltes, but contains a greater admixture of Schorl. Some parts, in which Schorl equally abounds, are made up of a white fine-grained sand. Feldspar is comparatively rare. Eastward of this hill to the village of Jittis above mentioned, the tract near the Ocean is but sparingly cultivated; towards the North the whole is an inaccessible marsh, bounded by the central ranges; near the North East exremity of this, the village *Pring-tuttul* is situated, which has been mentioned in the Geographical description.

After the examination of the Southern portion of the province of Banyumas, my attention was directed to those districts which are situated North and North-West from the capital: these occupy a considerable part of the declivities of the mountain of Tagal, one of the principal links in the volcanic series of this Island. Having crossed the river of Serayu, and passed several eminences which are covered with a deep soil, I entered on a tract nearly level, having only a gradual ascent in the North; it is composed of the districts of Passir and Probolingo, being bounded in the East by Banjar, and in the North and West by several of the Honorable Company's districts belonging to the residencies of Tagal and Cheribon.

Near Suko-rojo, the situation of which is marked on the map, a tract commences which is covered almost entirely by Tuff or Tufa, either united or in a state of disintegration, stretching about 12 miles to the Westward, till it meets the ridges extending from the declivities of the mountain of Tagal towards the Southern shore.*

* Exp. Cat. No. 28.

This Tufa is exposed in extensive stratified masses at the banks of the rivers and rivulets, which are filled with the separated fragments, mostly rounded by attrition: its texture is very loose, and the component parts, of minute fragments of basaltes, pumice, gravel and sand are distributed over the whole territory, and have probably given rise to the name of *Passir*, signifying sand or gravel, for the whole district. The proportion of clayey parts which were mixed with the Tufa have also accumulated in extensive masses, and contribute probably to the productiveness on account of which the soil of these districts, in many places, is celebrated.

Besides the rivulets near the villages of Bagor, Suko-rojo, Purwo kerto and Probolingo where it is very abundant, I noticed this Tufa, in a state of agglutination, in various other situations; it generally crumbles away on being taken up, but has also remained entire, covering large surfaces which resemble the more compact Pudding-stones of Karang-bollong, and resist the effect of the water flowing over them: but on the application of any force, as the stroke of a hammer, they instantly fall to pieces. The peculiarities in regard to other tufas of this Island, will be pointed out in the explanatory Catalogue.

In proceeding to the westward, the vicinity of a volcano in strongly indicated by the substances which have been carried down by the currents, in the rivers; the streams of *Banjaran* and *Logowok* in the rainy season are very considerable, and their basins in the dry season are filled * with fragments of lava, indicating apparently a

* Exp. Cat. No. 30.

* more recent origin than those which are found in the central ranges, in conjunction with the hills, formed by a deposition from water, and at a greater distance from either of the principal volcanic points which have lately been in action. It appears indeed probable that they were ejected by an eruption comparatively late, in as far as relates to the general arrangement of the strata of this Island: their character is different from those of Ujung-agung and Bedagangan above mentioned, which belong to the submarine lavas, and I shall soon point out the traces of a very extensive stream which flowed in a S. S. W. direction from the mountain. It has, however, appeared to me that the Tufa which principally composes this tract has a still more recent origin, and if many of the lavas must be considered to have been formed under the ocean, this tufa appears to be a mere mechanical agglutination of the substances of one of the later eruptions. Proceeding westwards from Purwo-korto I passed several of the projections from the central ranges, running out before the foot of the large mountain, and the indications of the Tufa were gradually lost. At Ajibarang the vicinity of an active volcano, already indicated by the detached fragments in the rivers of Banjaran and Lo-gowok, was more strongly exhibited: near the declivities of several of the ridges just mentioned, I traced, South of the chief village of this district, a stream of lava which appears to have flowed from the mountain in this direction: the vestiges of it covered an extensive tract in a de-

* Exp. Cat. No. 31.

clining situation, and extend to the rivers bounding it in the East and West: the lavas project in some parts in connected groupes, like rocks of granite from primitive mountains, or they are thrown together in detached fragments; the intervening spaces being covered with a deep vegetable mould: their surface is either smooth, like that of Basaltes, or cellular like scoriæ: *In the river *Datar*, which I followed several hundred yards through various windings and small cascades, I found an extensive channel of compact lava, consisting, in many places, of a vertical height of 30 feet.

Near its banks, an extensive fissure of one of †the ridges disclosed a cavity about 30 feet deep, consisting likewise of compact lava, separating spontaneously into large, more or less determinate blocks, often with regular sides, the surface of which is cellular, and in many instances of a reddish colour; the mass composing this eminence must be considered of anterior date, being covered by a thin stratum of rolled Basaltes of various sizes, mixed with sand and gravel. The stream in contact with this on the descent above mentioned, and probably also that which composes the basin of the river *Datar*, exhibited the appearances observed in our volcanoes after recent eruptions; separate disjointed blocks promiscuously thrown together, with adjoining groupes, more or less regular, approaching the nature of Basaltes. are often exhibited, as has been mentioned in another place,

* Exp. Cat No. 33.

† Exp. Cat. No. 32.

The color is black or inclining to red, the fracture compact or vesicular; in the former various foreign admixtures are perceptible, which will be pointed out in the separate description; in the latter the concavities are often numerous and close: these resemble the lavas rolled from our craters by the most recent eruptions, in a semi-fluid state, partaking of the nature of slags: many of those in which the fracture was compact could scarcely be distinguished from the common Basaltes of this Island.

At the river Kawung, which flows near the Western boundary of this tract of lava, in a situation about two miles North, inclining to the West, of the groupe above mentioned, I observed the most regular assemblage of prismatic stones hitherto noticed in any part of this Island; the fragments appeared to remain in the spot where they had been formed, the angles were still regular and sharp, and the extremity projected in most cases towards the rivulet with very little inclination. The separate fragments were four sided, and the angles mostly regular; the whole groupe occupied a length of about 30 yards near the rivulet, and 5 or 6 fragments were piled almost perpendicularly on each other; in a few intances only, they presented the longest side. This assemblage was remarkable, as it exhibited the only prismatic stone (of the Trap family Basaltes) I had hitherto noticed in which the angles were *not* rounded by attrition or shewed the marks of having been carried by a current.

In the river Tiajum I found again, in a situation South-west of the village of Ajibarang, the indications of the extend of this tract of Lava: here the fragments were mostly separate

but of immense size, and strewed promiscuously in the basin of the river; they appeared to form in this point, the western boundary of the tract, which, beyond the river, was met again by a hill descending from the grand central ranges in this direction.

The western banks of the river were confined by several ridges of moderate elevation; at the spot which I examined, a pile, of a somewhat pyramidal form, rose precipitously to the height of several hundred feet: the side near the river was completely naked, and exhibited its internal constitution. At the base a rugged mass projected, which at a distance resembled Lava, but on near examination was found to be an aggregate rock of a grey color, consisting of sand,* calcareous spar, and clay in various proportions of admixture: extensive groupes of spar appeared on the surface and on the fragments which were broken off: detached masses of a similar rock were afterwards found on the opposite side of the river, which were more compact, and in the fracture resembled amygdaloids; † they consisted chiefly of nodules of clay, bedded in a sparry mass. Resting on the aggregate grey rock at the base, and composing the greatest part of this eminence, was an extensive assemblage consisting entirely of a deposition from water, of great variety of configuration and arrangement, but chiefly of lamina and nodules. The whole side of the hill which was exposed exhibited this deposition in a nodular or tabular form, in groupes alternating with or mixed

* Exp. Cat. No. 34.

† Exp. Cat. No. 37.

through each other without any determinate order: the separate fragments had rolled down, and were found at the banks of the river, and bold strata extended into it and formed part of its basin; the arrangement of the separate nodulos was in concentric layers, but on being taken *up or removed from their original situation, they burst transversely and crumbled away in irregular concave lamina. The predominant color of the fracture was blueish-grey, externally most of the fragments were covered with a dirty yellowish ochreous crust: they slightly adhered to the tongue.

In attempting to ascend the hill, the various masses rolled under the foot and carried one back again; the top was covered with long grass. Some yards North of the groupe of grey rocks, at the base, in contact with the river, a mass was deposited which approached † the nature of sandstone: the portions which composed it had a disposition to separate in a more determinate angled manner, forming cuboid or trapizoid fragments, not unlike the configuration of many of our basaltes: the fracture was bluish and compact, and they were covered with a yellowish crust. A simple sandstone was also occasionally found in contact with the other assemblages forming this hill, resembling the grey rock at the base, but without any admixture of spar.

The district of Passir extends to that part of the foot of the mountain where the acclivity

* Exp. Cat. No. 35.

† Exp. Cat. No. 36.

becomes more abrupt; here it is bounded in the North by the small tract of Kumutuk, beyond which, the South side of the mountain has not been examined: the territory also consists of * Tufa resembling that of Purwo-kerto, but from the natural inclination of the district, all the small and loose fragments have been washed down towards the southern valley. It is covered by a deep soil, accumulated chiefly from a very luxuriant vegetation during a long period. In some parts a lava is exposed in the rivulets resembling the more compact kinds of Aji-† barang.

The constitution of Probolingo resembles that of Passir; towards the eastern boundary the quantity of sand and gravel on the surface is less abundant, but at the banks of the river Kelawing, near the chief village of this district, immense piles of Tufa are exposed, often to the depth of 30 feet, which, as well as that found near Suko-rojo, has compactness enough to be cut into tables or slabs, and employed in flooring the dwellings of the natives and for various similar purposes. In the pebbles of this river, carried down by the current, I also noticed the indication of extensive beds of siliceous stones in the central ranges: with the common rounded fragments of Lava, Basaltes and Sand-stone, were mixed Agates of various kinds, Prase, simple Hornstone, Hornstone-porphyry of great variety of colour and fracture, and a species of § Sandstone of a verdigris-green colour, having

* Exp. Cat. No 41.

† Exd. Cat. No. 42.

§ Exp. Cat. No. 22.

a disposition to a regular angular form, like the fragments of green Sand stone found at Nuso-Brambang: in the fracture appear minute particles of varying shades of colour, consisting of *Horn-stone and other siliceous stones.

Between the mountain of Tagal in the West, and the Sundoro and Sumbing in the East, the body of the Island is occupied by various ridges, the direction of which on the whole is from East to West. From the vicinity of the Sundoro they take a northern direction, and from the mountain of Tagal they incline to the southern shore. These ridges consist of several irregular chains of hills, the particular stretch and distribution of which cannot easily be ascertained with accuracy, as they are connected by numerous transverse links. From the intervening declivities and vallies many separate mounds of an oblong or conical form arise, which are almost uniformly rounded on the surface and covered with a deep soil.

Almost in the middle of the Island a very extensive valley exists, affording a basin to the large river of Serayu, receiving from the North and South numerous streams flowing to this central excavation, from which, in both directions, the ascent is gradual, but considerable. The highest points in the North are the mountain Prow, and in the South the Kuripan or Gunung Iju, two very conspicuous points, from which the territory continues uneven to the northern and southern shore, consisting of numerous vallies and irregular ridges. The valley which transmits the river Serayu was in

* Exp. Cat. No. 23.

former times distinguished by the denomination of *Lurung-tengu* or the middle valley, a name which is sometimes applied to the whole province of Banyu-mas, and the adjoining districts in the centre of the Island: from the capital, the direction of the river is soon turned off towards the South, by the branches of the central ranges descending in this direction.

On leaving the capital of Banyu-mas, I first pursued the common road leading to the eastward, which in the lower parts of the valley runs nearly on a level with the Serayu; I met the curves of this river in various places: On this part, to Purwo-ro'o, I observed on the projections from the central ranges which I crossed, extensive masses of a deposite from water, similar to that above described, Basaltic rocks, with angles rounded by attrition, rising from a deep reddish soil, and in the beds of the rivers of Piosso, Deris and Sapi, fragments of Basaltes and Lava; some of the latter were very cellular, and resembled those of the acclivity of the mountain abovementioned. At Purwo-rejo I could take into one point of view the first range of central hills, rising to the North of the valley of the Serayu, at the distance of about 8 miles: these are mostly long extended eminences, similar in their appearance to those stretching from Rangka to Kali-weddi, and indicating, at a distance, the same constitution: disposed among the extended ranges were observed precipitous piles, rising in many cases almost perpendicular, the nature of which is in a great measure elucidated by the hill Lawet, to be mentioned in the sequel: the elevation of all these, in comparison with the large mountain of

Tagal, the Sundoro and the Sumbing, is not considerable: these their principal volcanic points could here be taken into view at once.

On the track from Purwo-rejo to Gomuro, the numerous terminations of the descending ridges alternate with leved districts: they are all covered with a deep reddish soil or with vegetable mould: on proceeding to the eastward, the declivities which form the valley of the Serayu come nearer to each other. Between Gomuru and Kutto-waringin, I crossed this river about a mile below the entrance of the river Merawu, which descends with a rapid stream, in order to examine the principal of the northern eminences of the central ranges. At this point an extensive stratum of Pudding-stone is exposed at the banks, which is either compact, like that of Karang-bollong, or loose and friable, like the Tufa of Suko-rojo. Several of the separate fragments which I detached with some difficulty, resemble greatly the *common Hornblende* of Werner, although they must be classed with our Basaltes. This as well as the two specimens of aggregate rock *are decscribed in the explanatory Catalogue.

Of the rounded pebbles collected in the bed of the Serayu, the most remarkable were a compact Pudding-stone, apparently brought by the current from a distant situation, and a peculiar stone (of the Floetz-trap formation of Werne) resembling Wacke, of an obscure blueish grey color, traversed with white lines of various breadth from that of a hair to half an inch; Their direction is curved or undulating, and

* Exp. Cat. No. 45.

rarely regular, in some instances however they cross each other at right angles. The number of these lines is various; in some fragments a single streak was observed, in others the whole surface was variegated: they consisted chiefly of calcareous spar, as appeared by the application of an acid: the surface of all the fragments * was strongly rounded by attrition. The frag- † ments of Basaltes found in the river, were of different constitution, and indicated a derivation from different original situations: in some, small crystals of schorl formed a chief component part, others consisted, in great part, of minute groupes of Feldspar.

From *Banjar* I pursued my route in a Northern direction: this village is situated on the stream Merawu, about 2 miles above its discharge into the Serayu. Several very considerable points of the central ranges fall in the route I had proposed; they will be enumerated in the order I met them; but for their relative situation I must refer to the map which accompanies this Essay. The first is the hill *Pawinian*, which lies nearly North of the village of Banjar. The road traverses the Eastern declivities: these are divided by several deep ravines which are covered with a fertile black mould; in the vallies rounded fragments of basaltes are accumulated.

Almost directly East of the highest point of this hill, the steen pile, called *Gunung-Lawet* by the natives, is situated, which by its precipitous elevation attracts considerable notice at a

* Exp. Cat. No. 43.

† Exp. Cat. No. 44.

distance: as the road passes between the two hills, I had a good opportunity of examining it with care. When observed a far off, it appears to consist of several massive rocks which rise almost perpendicular from an extensive base: the Southern side appears cragged and broken, the Northern has a gradual inclination. The steepst parts are naked, the foot and severa-spots on the declivities are covered with shrubl and plants.

After a gradual ascent through a narrow pas sage or ravine, between the two hills, which is strewed with the detached fragments composing the Lawet, while the sides expose the same fragments closely arranged on each other, I reached the base of the Western pile. Here (in the South where I first examined it) it rises several hundred feet perpendicularly, being composed throughout of an assemblage of Basaltes. The form of the separate fragments is on the whole regular, consisting of prismatical masses, with defined angles: of considerable size. Some fragments had oblique angles, constituting rhomboids, pyramids, &c. with these regular prismatic or rhomboidal fragments, alternated in many places nodules of the same substance consisting of concentric layers.

The aggregate of the various masses on this side, constituted a stupendous wall, the component particles of which, more or less regular in themselves, were irregularly piled on each other, the alternate portions projecting and retiring from a perpendicular line.

The largest fragments, like many other basaltes, are marked with horizontal lines, indicating a further disposition to separate in a

manner similar to the fragments already detached: many of these are regularly tabular. The extent and boldness of this pile forms an interesting spectacle, of which it is difficult by description alone to give an adequate representation; it explains at the same time the constitution of the other perpendicular piles which are dispersed through the central ranges, and by their contrast with the rounded or extended ridges, attract the attention of the mineralogist. The Basaltes at the foot of this pile has a similar form, but the angles which project from the soil are blunt and rounded by attrition, shewing, as it were, the effect of substances which have been carried over them by a current.

On the fracture a grey or whitish color predominates, in consequence of the abundance of particles of feldspar and quartz, which enter * into its composition; through these are dispersed numerous crystals of schorl, hornblende and some times Augit. These also appear on the surface, which more than other Basaltes of this Island, inclines to a white color. Observed at a distance, this hill may easily be mistaken for an assemblage of calcareous rock.

The northern side of the western pile constituting the Gunung Lawet is much more uniform; it rises nearly perpendicularly, with very slight inclination, and no distinct separation into portions or fragments is perceptible: it exhibits the appearance of a stupendous wall of whitish colour, variegated only by a few excavations, apparently of later date, and (by no means numerous) longitudinal lines.

* Exp. Cat. No. 46.

On the further route between the Gunung Lawet in the East, and the hill Pawinian in the West, I noticed numerous fragments accidentally detached from this pile: they were remarkable on account of the regularity of their form, which was mostly tabular, the angles were defined and still entire, bearing no marks of external attrition. Here I also found several other substances (of the same Floetz trap formation according to Werner), but apparently of a more recent deposition: the most interesting *were several varieties of Sand-stone, one of which consisted of small uniform Lamina, about a line in thickness regularly imposed on each other, with defined sides and angles: in a second the fracture was uniform (like common Sand-stone) and the separate fragments appeared in rhomboidal and trapezoidal masses.

After passing the ravine between the mountains Pawinian and Lawet, a considerable prospect is afforded of the adjacent country in the North the hill *Telogo-leli* is the second point, in this part of the central ranges, deserving notice on account of its elevation; at the foot of it the river Uren is observed winding in a deep stoney valley; numerous small hills, irregularly scatterred, are observed in this tract, rounded on the surface and covered with a deep soil. The road now took a western direction, following for several miles the northern declivities of the hill Pawinian, which here is chiefly formed of a deposition from water, in many places concealed by a deep earth or by a vegetable mould, in

* Exp. Cat. No. 47.

others it is bare and appears on the surface; its constitution agrees with that above described, composing a steep hill South of Ajibarang on the banks of the river Tiajum, but it is disposed in layers which have a gentle inclination and apparently penetrate far into the body of the hill. Externally of these layers the various substances which form the base of the surrounding tract, are irregularly mixed together: among these were likewise fragments of volcanic Tufa, which I soon met in extensive piles. Some of this was coloured by iron (vide Sp. No. 49). The most remarkable rocky substances entering into the composition of this part of the Pawinian * hill were; 1: a sand-stone separating into rhomboidal and trapezoidal fragments, with angles mostly defined; some portions are lamellar and penetrated by and ochreous efflorescence; 2, a massive precipitation in which no regular form could be observed, consisting of clay, and separating like coagula of that earth, when dry, into various amorphous particles. The colour was grey of a blackish hue, and it adhered slightly to the tongue.

At the Western extremity of the mount Pawinian the road again takes a Northern direction towards the eminence of *Paggar-pella:* the surface is uneven, and occasionally exposes the continuation of the strata which abound in the whole tract. The principal village of this neighbourhood, is also distinguished by the name of Pagger-pella and situated near the top of this eminence; the ascent, from the South, is strewed with numerous tabular fragments of Ba-

* Exp. Cat. No. 48.

saltes: in the descent, in the opposite direction, the road was cut through a deep stratum of this *stone in a state of decomposition. Its hardness and adhesion was so completely destroyed, that it was as easily divided by a cutting instrument as a mass of clay or earth: if taken up by the hand it crumbled to pieces. The fracture resembled that of the Basaltes composing the pile of Gunung-Lawek: the white colour predominated, the lustre of the feldspar was lost, and the other component parts were eathy and ochreous: in some particles the angular form was still discernible in others the whole was united into one uniform mass. This decomposed Basaltes was afterwards found abundantly in the central ranges, where it constitutes one of the pricipal bases of our hills: the causes which have effected or influenced this decomposition. have heen peculiarly operative in certain tracts and situations Many of the fragments above this decomposed stratum were very compact, and resembled the Wernerian Greenstone, consisting of minute irregular particles of feldspar and †greenish hornblende, intimately mixed: among these I selected specimens of very determinate sides and angles: in the village of Paggerpella several very large rocks of this substance projected from the soil.

On the descent abovementioned a third point of considerable elevation is first observed in coming from the South, the hill *Roggo-jambangan*, exceeding in extent of base, and probably in height both the Pawinian and Telogo-leli. At

* Exp. Cat. No. 50.

† Exp. Cat. No. 51.

the Northern declivities is a nearly extinct volcanic crater, forming one of a series in this part of the Island which will be mentioned in the sequel. At the foot of the hill of Pagger-pella I crossed the river Urang: the fixed rocks near the banks are Pudding-stone and Basaltes; the pebbles in the basin are very much diversified; I selected the following, all evidently derived from a distant situation in the central ranges: viz:

1. *Lava of entirely vesicular constitution.

2. † Lava of the kind of sub marine-lava above mentioned, containing calcareous spar in narrow layers or irregular masses.

3. †† Compact clay in tabular fragments, the angles of which are rounded by attrition.

4. †‡ Compact Pudding-stone (or Amygdaloid) consisting of minute fragments of Basaltes bedded in a clayey cement.

5. § Sandstone in curved and recti-linear layers.

6. §§ Petrified wood with stony concretions.

The territory between the three principal hills of this part of the central ranges, the Pawinian, Telogo-leli and Roggo-jambangan, is covered by numerous inequalities irregularly dispersed, of which several deserve the name of hills: on the ascent of the ridge called *Sari* I met again stones of watery deposition. The village of *Karang-kobar*, the chief of the district of the

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* Exp. Cat. No. 52.
† Exp. Cat. No. 52*b*.
†† Exp. Cat. No 53.
†‡ Exp. Cat. No. 54.
§§ Exp. Cat. No 55.
§ Exp. Cat. No. 53*b*.

same name, in a direction nearly E. N. E. of Pagger pella, is situated in a concavity surrounded by low mounds with obtuse summits, by which the prospect is much confined. They are all covered by a deep reddish soil. Proceeding in a North East course I found again an extensive section of a hill, composed entirely of the same substances which form the principal bulk of the stratified points at Ajibarang and the Pawinian, being a pile of clay and Sandstone, in various modifications, and separating spontaneously into prismatical, rhomboidal and trapezoidal fragments, between which nodules consisting of concentric layers, formed of the same materials, and covered with an earthy *efflorescence, were thrust in. Traversing these hills in the direction above mentioned, after leaving the environs of Karang-kobar, I noticed in several spots, extensive beds and masses of Basaltes in a state of entire decomposition, resembling those of Paggar-pella; and in the further progress, the basaltic rocks, which projeted from a deep yellow soil, were much rounded at the angles by attrition.

Among the hills on the route to Kali-lunyar and in the environs of that village, are several elevated points projecting from the neighbouring unequal territory (which are marked on the map) namely, the hills Krangeang. Gaja and Lumbung, besides others of less note. The constitution of these is elucidated by the appearances I noticed in a valley near this village: here the depositions from water were very abundant, they extended almost perpendicularly

* Exp. Cat, No. 56.

or with very sudden inclination into the body of the hills. The substance of which they were composed was almost pure sand of a coarse * grain, or fine sand and clay in nearly equal proportions; the latter was often of reddish color. The arrangement of these substances was either lamellar or nodular in concentric layers: these occurred alternating with each other; but from the appearance of their relative arrangement they had remained at rest from the period of their first precipitation.

From the valley of the river Serayu to the ranges in the vicinity of Batur, the ascent is gradual but constant, and only interrupted by occasional ravines and vallies: this is strongly indicated by the vegetable productions; I shall only adduce one instance; at Karang-kobar although the Cacao-nut tree bears fruit, its productiveness is comparatively very scanty; at Kali-lunyar the tree vegetates without producing fruit; beyond this village to Batur no Cacao-nut trees are found, as they cannot support the climate of this elevated situation. The district between Nusupan and Batur affords a continuation of the appearances already described on this route: stones of watery deposition are often exposed by the sections of the hills; † the soil is deep and of a reddish color, the fragments of Basaltes which are occasionally strewed on the surface are strongly rounded at the § angles, and extensive masses of this substance

* Exp. Cat. No. 57.

† Exp. Cat. No. 59.

§ Exp. Cat. No. 58.

occur in a state of decomposition, forming in *some instances the base of entire ridges.

Batur is situated on the South-west declivities of the highest series, extending from the western foot of the mount Roggo-jambangan to the eastern extremity of the mountain Prow: the most interesting points of these ridges, in a direction from west to east, are the hills Butak, Piarangan, Pakerman, Nagassari, Koppok, Wismo, which deviates towards the south, and Diyeng and Telogo-Jebong, deviating towards the north. The assemblage of the Koppo, Diyeng and Tologo-jebong, with several other points, is denominated *Gunung-Prow*, from the appearance it exhibits at a distance: it projects considerably beyond the other points of this ridge.

According to a probable estimate, the elevation of Batur is equal to that of Selo on the Marbabu: this estimate is founded on the comparison of the vegetables growing in both situations, and on the temperature indicated by the thermometer: I found it on the 24th of October at Sun-rise at 53 of Fahrenheit's scale. The territory in the south is open, and exhibits an irregular succession of ridges, gradually descending to the valley of the Serayu, but without any uniform direction. Several long-extended ridges, with occasional bluff points, irregularly scattered, project more than others, they all indicate externally a formation and composition similar to these hitherto traced from Banjar to Batur. In the north of this village, the nearest point, the hill *Piarangan* rises, about

* Exp. Cat No. 60.

half a mile distant, with a precipitous elevation. I ascended it, and estimate its elevation at least 1000 feet above the surrounding level; it is covered with a deep soil and highly luxuriant vegetation: Basaltic stones in extensive layers are occasionally observed on the ascent projecting from a deep soil: their surface is burst and covered with an earthy ochreous incrustation.* Several detached fragments have a reddish color, and indicate the existence of beds of decomposed Basaltes near the foot of this hill.

The hill *Butak*, (which name, according to the application of the natives, includes the assemblage of all the ridges situated immediately North and North West of Batur) is connected, in the North-West, to the declivities of the hill Ptarangan, and in the east they pass into the *Pakerman*. This mountain is well known on account of the volcanic apertures which exist in its declivities: one of these is denominated *Guwo-upas* or the *Poison-cave*, by the natives, in consequence of the deleterious effect of the air it discharges on the animals that approach it, the other, the crater or *Kawa* of the natives, lies at the Western foot of the mountain, and explodes, at intervals of a few seconds, considerable volumes of smoke. The diameter of this opening is about 30 feet and its depth is considerable; near it is a smaller one about two yards wide. The natives have a superstitious aversion to approach these apertures, and I yielded to their sollicitations, at the sacrifice of the curiosity to examine their appearance: this was of less importance, as frequent opportunities occur of observing similar outlets.

* Exp. Cat. No. 67.

This neighbourhood was convulsed by the operation of a subterraneous combustion about the year 1786: after an earthquake which continued, at intervals, for the period of four months, an eruption forced its way not only through the existing volcanic apertures, above mentioned, but through the neighbouring territory to the extent of two miles in diameter. Various rents were formed which emitted a sulphureous vapour, separate tracts sunk away and were swallowed up by the earth; in one of these the waters of the rivulet *Dolog* entered and afterwards followed a subterraneous course. The sulphureous vapours were observed in the atmosphere four successive days. The village of Jampang, at the confines of this convulsed tract, was likewise buried in the ground, and the inhabitants who had not timely left their dwellings perished: several persons were killed by the materials ejected from various openings. The aggregate number of persons who lost their lives on this occasion, most of whom were females, is estimated at 38. This information was communicated to me on the spot, by two of the principal Demangs (or chiefs of villages) of the Karang-kobar district, both natives of respectability, one of whom personally witnessed the event. At the present period the effects are nearly obliterated, the sides of the excavations being covered by a profuse vegetation. I noticed the remaining concavities, and visited that in which the revulet Dolog sinks away. The water first accumulates in the remaining basin, which is about 30 feet broad, at the foot of a steep eminence, surrounded by large rocks of

Basaltes, and then almost insensiby filtrates into the earth. During the rainy season, when the water is increased by a strong afflux from the hills, a portion still follows the original bed of the rivulet. On the site of the village Jampang I observed a moderate excavation: it is deserted, and the remaining inhabitants have fixed themselves at *Kassiran* a village near the road leading from Batur towards Kadu.

Near the southern diclivities of the mountain Pakerman, the mountain *Nagassari* is situated, str. tching considerably to the South, and still further, in this derection, inclining gradually to the eastward, the mountain *Wismo*. The extent and elevation of the latter is more considerable than that of the Pakerman, Nagassari and the others of this range, all united at the base, and forming an assemblage, possessing separately almost the same degree of elevation: Their external appearance is likewise similar, they constitute somewhat extended ridges and the sides are excavated by deep ravines.

In various excursions through the declivities of the hills of Ptarangen, Pakerman and Nagassari, I selected explanatory mineralogical specimens; the most interesting were:

1. Compact lava of a bluish color.

* 2. Porous or cellular lava (emittiug when struck the sound of bricks) of a red colour: of this several varieties are found in different situation; on the whole the color abounds in this district, both in the lavas and in the soil.

* Exp. Cat. No. 62, 63, 64, 65 and 66.

*3. Compact Basaltes with determinate angles.

4. Several varieties of Basaltes in a state of decomposition, of which extensive beds are found in the vicinity.

In the route eastward from Batur, I first followed the Southern foot of the Pakerman and Nagassari; the road subsequently winds to the North between this hill and the mount Wismo and gradually ascends. On this track I passed the rivulet *Puti* and the remnant of the rivulet *Dolog*, and observed, very distinctly, the explosions of the Crater of the Pakerman appearing regularly after an interval of a few seconds.

Having passed the Eastern declivities of the hill Nagassari, the road approaches the hill Koppok, which conceals the Eastern points of this range. In proportion to the elevation of the district and the vicinity of the summits of the hills, the ravines become deeper and the ascent more abrupt. The river *Tulis* which after receiving the rivulets of Puti and Dolog, pursues a Southern course, and forms one of the principal branches of the Serayu, winds through a very deep valley on the sides of which basaltic rocks are exposed: these are observed in large masses, forming extensive piles on the acclivities further eastward; their angles are all rounded by attrition. The elevation is now apparently about 1000 feet above the level of Batur, in as far as it is indicated by the vegetable productions: very few of those growing in the lower parts of the valley of the Serayu are now met with, but Casuarina *Chomoro* is here the

* Exp. Cat. No. 61.

most common tree: the trunk is abundantly covered with various kinds of moss, resembling that of the Northern countries of Europe: many species of Epidendrum, of Lycopodium, &c. commonly found in colder climates, are suspended from the branches. The number of rare Ferns is also considerable.

* The territory near the summit of this connected ridge, is covered with a reddish soil, mixed, near the surface, with black vegetable mould. The village of Konang is situated in a slight concavity, surrounded on all sides by several narrow ridges, descending from the mount Diyeng, and inclining towards the mount Wismo; the principal of these, in the South, is the Wagertipis. In the North of this village, on the descent of the mount *Diyeng*, another volcanic opening exist, which, like that of the Pakerman, emits smoke at intervals. On this elevated tract, covered with a highly fertile soil, vegetation is very luxuriant; several plants are spontaneously produced, which in general, are considered as the exclusive inhabitants of colder climates.

On the descent of the hill *Telogo-jebong* (the denomination which is here univormly given to the Southern declivities of the mountain Prow) I noticed lava, basaltes and pudding stones alternating with each other, and recurring at intervals without any determinate disposition. Both the lava and basaltes have been employed in the construction of an artificial stair, which extends through the greatest part of the

* Exp. Cat. No. 68.

descent of this mountain, and which constitutes one of the most stupendous vestiges of the ancient inhabitans of this Island; in a fragment of one of the slabs of which the stair is constructed, among the explanatory specimens annexed to this Essay, the fracture exhibits various foraminula filled with a white siliceous stalactitical substance, the rest is composed of quartz and hornblende, through which mica is *sparingly dispersed. This mountain, as well as the Diyeng, contains several extinct volcanic apertures which at the present period are filled with water, and constitute „*Telogos*" or lakes according to the denomination of the natives. From the *Telogo-jebung* the whole mountain has been named; at the foot I observed the *Telogo-menjer* near a village of the same name. The descent of the mountain to the village *Kayu-Rangkang*, near the lakes last mentioned, is very sudden, and the perpendicular elevation from here to the summit is at least 1500 feet.

From the village *Kayu-Rangkang* to the river Serayu, which I crossed near the Chinese farm of Jawar, the descent is gradual, and only interrupted by the ravines descending from the neighbouring mountains, and meeting each other from various directions. The Serayu flows with a rapid current from north to south, arising from the hill Jajar, near the Eastern declivities of the moutain Prow: its basin is strewed with large rocks of Basaltes.

On the route from *Kayu-Rangkang* towards the south, I observed on the sections of the hills that were accidentally exposed, Tufa of various

* Exp. Cat. No. 70.

constitution: it was often arranged in strata and resembled a coarse sandstone, but its adhesion was generally so slight, that it crumbled to pieces if removed from its original situation; in some instances, however, it was compact.

The village of Kali-Bebber is situated about eight miles south of Kayu-Rangkang, in a tract which gradually declines towards the central valley, the direction of which, in this part of the Island, is nearly from east to west. The river Serayu (not far from its source) flows towards it from the north; the river *Begalu* from the east; besides these many smaller streams from the neighbouring mountains direct their course towards it, and contribute to one of the principal rivers of the Island, which has already frequently been mentioned in the preceding Essay.

Not far from Kali-Bebber the territory sensibly rises in the north-east towards the mountain Sundoro, one of the principal points of the great volcanic series, which indicates at present the continuance of the subterraneous combustion, by occasional discharges of smoke and flame, and the appearrances in the vicinity afford the strongest marks of former eruptions of a more formidable kind. Besides rocks of very considerable bulk and extent projecting from the soil, the surrounding territory is covered with smaller fragments of basaltes, which appear to have been carried down from the steep sides of the mountain, and to have accumulated in the districts of more gradual inclination. The size of these fragments is very various; in general they have a trapezoidal form, and a diameter of 6 or 8 inches. They are abundantly dispersed over the ground which is in a state of culture,

and the natives here uniformly employ them for inclosing their villages, gardens, &c. &c. Their fracture and composition is similar to that of many other basaltes found near our principal *volcanoes. With these lava is found, in many situations; it is almost generally exposed in the beds and at the banks of the rivulets, either in solitary rocks or in collected groupes; it resembles the recent lava found in other parts of this Island; the color is black, the fracture vesicular, or similar to slags, and it emits when struk, the sound of brick. Lava of the same † kind was found, on my further route, at intervals in every part of the environs of this mountain, and has probably been ejected from the crater, like most of our recent lavas, in masses, which having congealed near the summit, rolled to the declivities in solid slaggy fragments. The elevation of the environs of the village of Kali-Bebber is still considerable—I observed the Thermometer on the morning of the 29th October at 68 degrees of Fahrenheit's scale.

From here I proceeded in a southern direction continually towards the central valley. In the numerous ravines descending from the sides of the mountain Sundoro, which I crossed on the way to Kerteg, and consequently eastward to the valley which unites this mountain to that of Sumbing, I noticed similar appearances. Besides the basaltic fragments which lay loose in large numbers at the bottom, their sides exposed deep layers of Pudding-stone of a com-

* Exp. Cat. No. 69.

† Exp. Cat. No. 71.

pact texture, and of Tufa. They were both found solitary or in alternate strata. In a superior situation, and mixed with the detached fragments of Basaltes, the slaggy lava, above * mentioned, frequently occurred.

On the descent towards Kerteg, I regarded at a distance the continuation of the numerous ridges stretching from the highest point of the range towards the central valley: they agree generally in form with those above described to the south of Batur, following aggregately a direction from North-east to South-west.

South of the central valley the ridges rise again to a considerable elevation. One very conspicuous point is here observed, denominated *Gunung Koripan*, or *Damak yu* by the natives: it has already been mentioned above, as constituting in the south the highest point, in opposition to Gunung Prow in the north. The districts of *Gowong* and *Selo mane*, and the southern portions of *Ledog*, which compose this part of the tract bounding the central valley, consist of an assemblage of ridges pursuing a direction from east to west; in the vicinity of Kerteg several separate hills are scattered, without any regular disposition. The constitution of these is explained in a great measure by that of the ravines on this route. Rounded Basaltes, † Pudding-stones and Tufa are strewed promiscuosly, or arranged in strata. The stream of *Begalo* is here discerned, arriving from the western declivities of the mountain Sumbing, to meet the Serayu about 9 miles to the westward.

* Exp. Cat. No. 71 and 72.

† Exp. Cat. No. 74.

From Kerteg the territory gradually ascends towards the village of Rejo, situated at the western extremity of the valley, by which the mountains Sundoro and Sumbing are united: it is formed by the declivities of both passing into each other, and affords a very convenient passage between these mountains, whose summits are separated only 10 miles: the situation of the Sumbing inclines from the Sundoro towards the South-east. No traces of a very recent eruption can be perceived on either at the present period; they are completely covered with vegetation, and their sides are excavated by deep ravines.

Of these two volcanoes the Sumbing has been the longest at rest. On leaving the valley an † extensive propect opens in the eastward, and the volcanoes of Ungarang, of Marbabu and Marapi come successively into view, beyond and intervening tract of about 20 miles, the appearance of which produces a most striking effect on the attentive traveller. No part of the Island, perhaps, affords, at one glance, a more extensive district covered uniformly by that species of hills, the form of which explains in a great measure their origin and ancient situation: here a numerous assemblage is dispersed over an extensive country, the base of which has nearly the same level. The elevation of the separate hills is not considerable; they are in most cases conical or oblong, and rounded or blunt above. To a person arriving from the westward, this as-

* Exp. Cat. No. 73 Lava on this route.

† Exp. Cat. No. 76 Lava from the Mountain Sumbing.

semblage exhibits an appearance not unlike the ocean in a violent state of agitation. The northern hills appear to form a connected ridge, stretching along the horizon, from the foot of the mountain of Ungarang towards the declivities of the mountain Prow. Their constitution is already explained by the description of the various central ranges on the preceding route; they are composed of the same materials; basaltes abounds in all, bearing uniformly strong marks of attrition, as well in those fragments which remain on the declivities, as in those that have been carried down to the vallies and to the basins of the rivers and rivulets. In the vicinity of the Sundoro and Sumbing large fixed rocks project from the soil, and the detached fragments are very numerous; towards the eastern volcanoes the territory is covered, more deeply, by a reddish soil, and the basaltes in many cases exposed by sections of the hills, * indicates an incipient decomposition. Here some large rocks of this substance were also found, composed of particles which separated into tables or slabs on the application of external force: they were often marked on the surface † with parallel transverse lines.

The principal river pervading this territory, the *Progo*, arises from the norhern declivites of the Sundoro, and, after receiving numerous branches from this mountain, the Sumbing, and the declivites of the mountain Ungarang, flows in a nearly direct southern course towards the ocean: the most considerable of its eastern bran-

* Exp. Cat No 77.

† Exp. Cat No. 75.

ches is the river *Ello*: both streams retain for a considerable distance a parallel course through an extensive basin between the western and eastern series of volcanoes of this part of the island, which connects them to the south.

The district just described, composed chiefly of irregular hills with intervening plains of no great extent, forms a large part of the province of Kadu: its elevation is considerable, and the temperature is favourably influenced by the vicinity of several of the largest mountains of the Island: in the west it consists of the districts of the Sunders and Sumeing, in the east of those of the mountain of Ungarang, of Marbabu and Marapi. Numerous streams and rivers arising from these affords a very abundant supply of water.

Besides the common grains, rice, Indian corn, &c. which are largely produced, the territory is peculiarly favourable to the cultivation of various other vegetables requiring a moist and elevated soil—the *Tobacco* is superior in quality to that of every other part of Java. The *horses* of the Kadu are well known: besides their other qualities, being bred on a stony tract, their hoofs possess, in general, a degree of soundness and toughness which renders them useful in travelling over stony roads.

Immediately beyond the basin of the river Ello, the territory ascends again towards the mountain of Marbabu, which constitutes the centre of the transverse series of volcanoes, consisting of the mountains of Ungarang, Marbabu and Marapi, to the east of the Basin of the Progo; the description of these is comprised in the continuation of the general mineralogical Essay.

CATALOGUE

Of Explanatory Specimens.

No.

1. Pebbles, from the river Progo, near Brossot.
2. Basaltic fragments, from the shore at the Cavern called Guwo-Dahar.
3. Calcareous rock, denominated Batu-churi by the natives, from the eminence above the Guwo-Dahar.
4. Hornstone-rock, from the eminence above Guwo-Duhar, called Karang-Kuda.
5. Pudding-stone, from the cavern of Karang-bollong, near the extremity of the hill, at the discharge of the river Chiching-goleng, from which the village and settlement has derived its name.
6. Fragments of Basaltes, from the same.
7. Stone of watery deposition, lamellar, nodular, &c. from the eminence between the discharge of the river Chiching-goleng and the village Karang-bollong.
8. Calcareous stone, found in large piles on the hill above Guwo-Nagassari.
9. Pudding-stones, from the entrance of the cave of Nagassari near the ocean.
10. White, friable, semi-decomposed lava (denominated *Padas* by the natives, bolonging to the substance named *Tufa*) found copiously on the hills on the route from Karang-bollong to Jittis: (similar to No. 7.
11. Same substance (No. 10) more compact, forming Sand-stone found on the same route.
12. Hornstone-porphyry, from the shore near Jingkla.

13. Calcareous spar, from the same place.
14. Black sand, from the beach opposite the discharge of the river Aya.
15. Pudding-stone, from the foot of the hill near the place of passing the river Chichinggolong, on the road to the village of Karang-bollong
16. Stalactitic calcareous stone, from Rangka, employed in burning lime at Karang-bollong and neighbourhood.
17. Trapezoidal stone, of a greenish colour, the fracture resembling Sand-stone.
From Nuso-Brambang.
18. Cavernous lava, from Ujung agung on Nuso Brambang.
19. Pudding stone, from the same.
20. Rounded pebbles, from the shore near the deserted villages of Banjar and Brambang on the same.
21. Calcareous rock, from the point Tanjung Karang-pachi; from the same.
22. Calcareous roch, in extentive horizontal strata near Brambang, from the same.
23 Calcareous stone, from the foot of the hill near Karang-bolo, from the same.
24. Basaltic stones, from a rivulet near the village Brambang from the same.
25. Sand-stone, from an extensive stratum at the banks of the river of Adiraja, in the district of Aya
26. Cavernous lava, from the discharge of the river Adi-rojo near the village Sawangan.
27. Lava separating into Rhomboidal fragments, from the foot of the hill Bedagangan, opposite to the village of Adi-raja, found at the banks of the river.

28. Volcanic tufa, Padas of the Javanese, from Suko-rojo.
29. Volcanic tufa from Purwo-kerto.
30. Lavas from the basin of the river Banjaran, arising from the foot of the mountain of Tagal.
31. Lavas from the river Lo-Gowok, arising from the same mountain.
32. Lavas from the river Datar naer Ajibarang.
33. Lavas from the declivity south of Ajibarang, and from various other situations in the neighbourhood of that village.
34. Stone of watery deposition, from a hill south-west of Ajibarang, near the banks of the river Tiajum.
35. Varieties of stone of watery deposition from the same place (No. 34.) in lamellae, nodules, tables, &c. &c.
36. Sand-stone from the same place.
37. Rock from the banks of the river Tiajum (resembling Amygdaloid) near Ajibarang.
38. Lavas from the road towards Bojong-Tongo, in the district Probolingo.
39. Varieties of Tufa, from the river Kelawing near Probolingo.
40. Various siliceous stones out of the same.
41. Tufa from Kumutuk.
42. Compact lava from the same place.
43. Variegated stones, found among the pebbles in the bed of the river Serayu near Banjar.
44. Rounded volcanic pebbles, from the same place.
45 Fragments of aggregate rock, from the banks of the river at the same place (No. 44.)
46. Fragments from the large piles composing Gunung Lawet, consisting of tabular, &c. Basaltes.

47. Sand-stone from the foot of the same (see No. 49.)
48. Stones of watery deposition, from the foot of the hill Pawinian, on the route from Banjar to Pagger-pella.
49. Reddish Sand-stone from the same.
50. Basaltes in a state of decomposition, from the Northern declivity of the eminence of Pagger-pella, on the road towards Karang Kobar.
51. Varieties of original Basaltes from the same.
52. Lava from the basin of the river Kali-urang near Pagger-pella (vesicular, belonging to the lavas of later eruptions.)
52*b*.) Submarine lava from the same place (No. 52.)
53. Compact clay in tables, with angles rounded by attrition, from the same place.
53*b*.) Stone consisting apparently of petrified wood with sparry depositions.
54. Compact Pudding-stone (Amygdaloid) from the same (No. 52.)
55. Varieties of Sandstone from the same (No. 52.) fragments in thin lamellae, close and rectilinear, or concave—(apparently portions of spherical masses.)
56. Stones of watery deposition, from an eminence east of Karang-kobar.
57. Stones of watery deposition, found in extensive vertical strata at Kali lunyar.
58. Basaltes in a state of partial decomposition, from the section of an eminence on the near Kali-lunyar.
59. Stones of watery deposition, taken from an eminence between Kali-lunyar and Nusupan.
60. Basaltes in a state of partial decomposition

from an eminence eastward of Nusupan, on the road towards Batur.

61. Basaltes found near Batur.

62.

63.

64.

65. Varieties of lava found near Batur.

66. Partially decomposed Pudding-stone, from the road towards the hill Pakerman.

67. Partially decomposed Basaltes, from the mountain Ptarangan, near Batur.

68. Reddish lava, on the road from Batur to Konang.

69. Basaltes from the rivulet (Kali-Iring near the village Kali-Bebber.

70. Fragment of an artificial stair, on the descent of the mountain Telogo-jebang or Prow.

71. Varieties of lava, from the foot of the mountain Sundoro, near the village of Kali-Bebber.

72. Varieties of lave from the same place (No. 71.) taken on the road between Kali-bebber and Kerteg.

73. Varieties of lava found on the road between Kerteg and Rejo.

74. Volcanic Tufa between Kali-bebber and Kerteg.

75. Basaltic rock, separating spontaneously in tables, from the tract between Jittis and Pakkis-wiring.

76. Lava from the environs of mount Sumbing found near Pakkis-wiring.

77. Basaltic-stone in a state of incipient decomposition, the surface being friable and earthy, from a hill on the route between Pakkis-wiring and Kamantran.

SECTION IV.

Catalogue of the Plants observed during the preceding Tour.

Class I. *Monandria.*

Phrynium dichotomum Roxbgh. Scitam pl. As Res. vol. XI. [Willd	
Thalia cannæformis	Bamban, of the *Javanese*
Phrynium capitatum	Angrik or Pattal
Amomum	Karawulu
Amomum	Teppus
Amomum	Unje-unje
Amomum	Wersa
Amomum	Unker-unkeran
Costus speciosus	Paching
Alpinia	Kapollan

Class II. *Diandria.*

Jasminum multiflorum	Poncho-sudo
Justicia Betonica	Loro-wudu [Adasadasan
Justicia	Mungsa, Kalamuksa, or
Justicia (see violacea	Juru-demmung
Justicia [Willd)	Gondorusso-kebo
Justicia	Kelumba
Justicia chinensis	Pinten
Justicia Gandarussa	Terus or Gondorusso
Justicia	Sukat-sawa
Justicia	Sambang-lema
Justicia	Teppu
Justicia Hyssopifolia	
Justicia	Native name not deter-
Justicia	ditto [mined.
Justicia	ditto
Piper Cubeba	Kumukus
Piper	Chabean

Genus doubtful		Patty-kulit or Barra
Genus doubtful	Sp. I.	Babad-kandel
Same Genus	Sp. II.	Ketopra
Same Genus	Sp. III.	Ke-ji-warak or Brabas
Same Genus	Sp. IV.	Uwakwan
Same Genus	Sp. V.	Sido-toppo
Same Gunus	Sp. VI.	Native name not determined
Same Genus	Sp. VII.	ditto

Class III. *Triandria.*

Valeriana	Kettul or Chumplongan
Genus doubtful	Konin-jingan
Genus doubtful	Nat. name not determined. (Herbary No. 772)

(Note—*The Grasses are omitted in this Catalogus.*

Class IV. *Tetrandria.*

Hedyotis *foetida m*	Simbu-an-lemma
Hedyotis	Attak
Ixora	Sikattan
Ixora *longifolia m*	Tomandellan
Callicurpa	Sangko
Cissus	Banyon
Relhamia	Bollang
Relhamia	Singkil
Plantago asiatica	Kuping-menyangan
Embothrium	Kendung
Embothrium	Krenyes
Gonocarpus	Derennan
Chloranthus inconspicuus	Kres-tulang
Genus doubtful	Api-api
Genus doubtful	Duduk-rayab
Genus doubtful	Putian or Gedean
Genes doubtful	Krema-gunung

Class V. *Pentandria.*

Heliotropium indicum	Ge-ja-an
Myosotis	Patra-wisa
Tournefortia	Angsang
Tournefortia	Simbu-an-kayu

Ophiorrhiza	Jokko-tuwo
Ophiorrhiza Mungos	Patty-Uler
Plumbago Rosea	Mud-ja
Convolvulus pellatus	Blaran
Convolvulus	Kang-kung-Kang-
Convolvulus	Pes-caprae [kung-an
Convolvulus nervosus	Native name not deter-
Convolvulus vitifolius	[mined
Convolvulus	Sampar-kidang
Campanula	Sukat-en-jari
Nauclea	Chautel-wessi
Nauclea	Kleppu
Scaevola Lobelie	Wudelan
Lobelia	Raggi-Jajar
Lobelia	Bawangan
Lobelia	
Coffea	Jambon
Morinda citrifolia [culta)	Wongkudu
Morin. (varictas citrifol-	
Mussaenda frondosa	Walli-kaddeb
Mirabilis Jalappa	Kembang-pukkul-ampat
Physalis	Chi-plu-au
Solanum	Ranti
Solanum verbascifolium	Tetter
Ardisia *littoralis m*	Lempennen
Ardisia	Lempenni
Ardisia	Walluk
Ardisia	
Cordia	Kendal-rambat
Cordia Myxa	Kendal
Tectona grandis	Jati
Rhamnus	Kandri
Rhamnus	Gondopuran, Kamalon
Rhamnus	Pepe-lout, Singkil-
Mangifera (var. indic.)	Po [rampat
Viola	Lenga-tangan
Impatiens cornuta	Pachar-banyu
Impatiens triflora	
Leea	Lengki, Kayu-bowaya
Leea sambucina	Tuwa

Leea acquata	
Vitis *siercoracea m*	Greng-gutu
Aegiceras majus	Truntung
Achyranthes	
Achyranthes sangvino-lenta	
Celosia castrensis	
Rouwolfia	Plentru
Cerbera Manghas	Binteru
Tabernaemontana	Pule
Asclepias gigantea	Weduri
Apocynum frutescens	Raggi
Natural order contortæ Genus doubtful	Jombirit
ditto ditto	Oyod-kepitting
ditto ditto	Ri-bettu or Kelongkit
ditto ditto	Pottong-assu
ditto ditto	Tipis-kulit
Psychotria	Sekulan
Psychotria	Wattuk
Psychotria	
Psychotria	Native name not determined
Psychotria	Kudon
Hydrocotile asiatica	Pung-ga-gan Panigowong
Caucalis	
Sambucus	Kettul
Basella	Kenchur
Mahernia	Wesnu
Polyscias	Gorang-irêng
Polyscias	Gorang-klanting
Polyscias	Chelangan, Tanganan
Polyscias	Oyod-tangan
Polyscias	Puchangan
Polyscias	Sanhang, Pampung
Polyscias	Gigil, Gabusan
Genus doubtful	Tembessen, Bimossetti
Genus doubtful	Telos-kepollo
Genus doubtful	Bangkong, Tempowiyung
Genus doubtful	Duduk-agung
Genus doubtful Sp. I.	Delu-alas
Same Genus Sp. II.	Tiba-buntil, Gemblek

Genus doubtful	Jalen
Genus doubtful	Gundo, Gudean
Genus doubtful	Mandillan, Gambiran
Genus doubtful	Gorang-pute
Genus doubtful (Man-i-	Ingas, Rengas
Genus doubtful [fera)	Kemiri-seppet
Same Genus	Pen-jalinan
Same Genus	Kayu-sapi
Genus doubtful	Sekkar-Jalla, Mallattan
Genus doubtful	Jeruan, Ri-kuwut
Genus doubtful	Dukut-Serru
Genus doubtful	Native name not deter-
Genus doubtful Sp. I.	[mined
Same Genus Sp. II.	
Genus doubtful	Sala-Nyowo (Sp. II.)
Genus doubtful	
Genus doubtful	Kayu-tyn, Itil-biru
Genus doubtful	Sekulan, Kiput.

Class VI. *Hexandria.*

Trandescantia	Patungan
Crinum asiaticum	Bakung
Curculigo	Nyangko
Dracaena ensifolia Lin; Dianella nemorosa La- [mark	Tog-gare
Tacca pinnatifolia	Urean
Calamus Rottang	Rottan-mas, Rottan-cha- [ching — with many other varieties
Bambusa	Pring—many varieties
Genus doubtful	Lompongan
Genus doubtful	Oger-oger

Class VII. *Heptandria.*

Jonesia.	Belanak

Class VIII. *Octandria*

Allophylus	Klayu [kodok
Clausena [Ind)	Kayu-toun, Kemuneng-
Clausena excavata (Burm:	Tikussan

Dodonaea	Kesse
Xylocarpus Granatum	Nyeri, Jombo
Schmiedelia racemosa	Chukilan
Schmiedelia	Badot
Polygonum	Barang
Polygonum chinense	
Polygonum orientale	
Polygonum barbatum	
Polygonum	Tebonnan
Genus doubtful	Wallerlar, Kayu-antang
Genus doubtful	Bolo-dowo, Dondang
Genus doubtful	Endog-endogan.

Class IX. *Enneandria.*

Laurus	Kayu-jey or Nyampu-
Laurus	Krangeang [gedobog
Laurus	Pachol
Laurus	Teja
Laurus	Wurn
Laurus	Wuru-kunyit
Laurus	
Cassyta filiformis	Sukat-kremi

Class X. *Decandria.*

Cassia obtusifolia	Keteppeng
Cassia alata	Keteppeng-kebo
Cassia	Wringinan
Guilandina	Wewe
Gaertnera racemosa	Kakkas

b.,-a variety with winding stem: Kakkas-rambat.

Cynometra ramiflora	Keppel
Cynometra	Ipil
Adenanthera	Saga-kebo
Limonia	
Sandoricum indicum	Sentul
Sandoricum	Keddayu
Melastoma malabathrica	Seng-gani
Melastoma speciosa *m*	
Melastoma	Tembagan
Melastoma	

Melastoma	Pari-jotto
Casearia	Balung
Arbutus	Manis-rejo
Arbutus	Girmot, Rangutan
Arbutus	Kembang-Kepitting.
Andromeda	Pruwoko, Pruwosoto [Gumeu
Dais octandra	Siri-jawan, Lawe
Cerastium	Bro-jo-lintan
Oxalis corniculata	Somang-gi
Robergia	Popouwan
Spondias	Rou
Banisteria	Re-mas
Genus doubtful	Ares, Kayu-gedang
Genus doubtful	Jirekan, Klimo-kouchir
Genus doubtful	Ri-Kengkeng
Genus doubtful	Ampet, Sing-ganen

Class XI. *Dodekandria.*

Bassia	Kommit
Rhizophora	Bakko
Rhizophora	Tanchang
Triumfetta	
Kleinhofia hospita	Timoho
Sterculia Balanghas	Antap Kayu-lummit
Sterculia foetida	Keppo-jangkang
Sterculia	Dok-dokkan
Serculia	Chu-chuk-urang

Class XII. *Icosandria.*

Psidium pyriferum	Jambu-klutu
Engenia racemosa	Putat
b. Variety	Putat-tresse
Engenia	Song-gom, Bedér
Engenia	Telampok
Engenia	Jambon
Engenia	Glunden, Besole
Engenia	Gowok, Klessem
Sonneratia acida	Bogem
Sonneratia (variety of the preceding) - - -	Prapat

Sesuvium portulacast-	Krokot, Gelang
Spiraca [rum	Wari-gunung
Rubus moluccanus	Brembetc
Rubus parvifolius	Uchi-uchi
Rubus	Grung-gung
Fragaria	Saprahan

Class XIII. *Polyandria.*

Calophyllum Inophyl-	Nyamplung
Elaeocarpus serrata [lum	Jenitri
Microcos paniculata	Delluwak
Alangium hexapetalum	Komlentoro
Uvaria *florida m*	Kalak
Uvaria	Native name not deter-
Uvaria	Kalak-prit [mined
Uvaria	Chempoko-baros
Annona	Chellalak
Dillenia	Sempu
Dillenia	Gregel
Ranunculus	Mas-massas
Genus doubtful Sp. I	Umbel-umbellan
Same Genus Sp. II	Umbel-umbelan-kebo
Same Genus Sp. III	Umbel-umbellan-prit
Same Genus Sp. IV	Umbel-umbelan-abang
Genus doubtful	Native name not deter-
Genus doubtful Sp. I	Wadang, Bayur [mined
Genus doubtful Sp. II	Walang
Genus doubtful	Jirak
Genus doubtful	Gobedan
Genus doubtful	Gudean, Sadang

Class XIV. *Didynamia.*

Mentha auricularia	
Leonurus	Kleng-leng-an
Betonica	Jung-gul
Stachys	Sangketan
Stachys	
Ballota disticha	Slangking
Seutellaria	
Ocymum	Sangket

Ocymum	Wrikki
Ocymum	Dillem
Mellitis	
Ruellia antipoda	Krok-nangsi
Ruellia Anagallis	Krok-lawok
Volcameria inermis	Gambir-lout
Volcameria serrata	Sri-gung-gu
Volcameria	Melati-alas, Lorunko
Clerodendrum	Trembuku
Thunbergia	Chuchuk-dandang
Vitex trifolia	Lagundi
Vitex	Ketilêng
Vitex	Laban
Vitex	Ampu
Bignonia	Kappal
Bignonia	Pichisan, Kapallan
Bignonia indica	Wungli
Acanthus illicifolius	Jeru-ju
Mimules	Kri-yak

Class XV. *Tetradynamia.*

Sinapis sativus	Sawe
Cleome	Komandellan

Class XVI. *Monadelphia.*

Bombax heptaphyllum	Randu-agung
Sida retusa	Sidoguri
Urena lobata	puluttan
Hibiscus Abelmoschus	Waron
Hibiscus Surattensis	Ri-larat, Usi-usi
Hibuscus	
Genus doubtful	Munung, Wining

Class XVII. *Diadelphia.*

Polygala *pendula m*	Native name not determined
Polygala	ditto ditto
Abrus precatorius	Saga
Crotalaria	Orrok-orrok
Crotalaria	
Erythrina Coralloden-drum	Chang-kring
Erythrina	Dadap

Dolichos	Kesse
Galedupa arborea	Krand-ji
Galedupa (scandens)	Gaddel, Tower
Hedysarum (var. unbellat?)	Belanakkan
Hedysarum strobili-	Gattak
Hedysarum [ferum	Gudean
Hedysarum	
Hedysarum	
Lotus	Somang-gi-gunung

Class XVIII. *Polyadelphia.*

Durio Zebethinus	Duren
Munchausia speciosa-(*Lagerstroc mia Reginæ*)-	Wungu
Hypericum	Unje-unje

Class XIX. *Syngenesia.*

Sonchus	Sumbrêng
Sonchus	Kayu-Rono
Lactuca	Tespong
Bidens bipinnata	
Ethulia	Saprag
Eupatorium	Te-gunung (mollo
Artemisia	Rodo - mollo, Godo-
Gnaphalium	Sendiru
Gnaphalium	
Conyza	Sembung
Conyza	Trassen
Senecio	Tegel-kiyu
Aster	
Verbesina	Sruni
Verbesina biflora	Urang-aring
Verbesina	
Sphaeranthus globosus	
Genus Doubtful (Comp. Genus *Hubertia*)	Sembung (with arboreous stem)

Class XX. *Gynandria.*

Orchis	Native name not deter-
Stilago Bunius	Wuni [mined

Epidendrum pyramidatum *m* ---	---Bawangan
Epidendrum (Herbario No. 766)	
Epidendrum (Herbario No. 767)	
Epidendrum (Herbario No. 763)	
Epidendrum (Herbario No. 764)	
Epidendrum (Herbario No. 765)	
Epidendrum (Herbario No. 768)	

Class XXI. *Monoecia.*

Artocarpus incisa	Sukkon
Artocarpus	Purut
Artocarpus	Bendo
Casuarina	Chomoro
Hernandia sonora	Kemiren
Urtica longifolia	Lunyar
Urtica	Jurang
Urtica	Jurang-rambat
Urtica	Menchogan
Urtica candicans	Ramen
Urtica	Sumpel-wuwu
Urtica aestuans	Kemadu
Urtica	Native name not determined
Amaranthus	Bayem
Epibatherium	Sluru
Arum	Banga
Arum	Dadag, Slempat
Arum	Klatta
Arum	Nampu
Begonia	Trembilungan
Caryota urens	Kendiru, umbu-enduru
Fagus	Sarangan
Quercus	Passang
Areca	Jambi Pi-ji
Phyllanthus urinaria	
Phyllanthus	Mer, Immer, Tomtoman
Phyllanthus	Katu-kebo
Phyllanthus	Dempul
Croton	Blo-ketupu
Croton	Kepét, Sawagi

Croton	Merangan
Croton variegatum	
Croton	Tutub ka-jang
Croton *coccineum m*	
Ricinus Mappa	Tutub-anchur
Ricinus	Tutub-awu
Jatropha curcas	Jarak pagger
Aleuritis triloba	Kemiri
Gnetum (E: volubilis)	Tangkil
Momordica Luffa	Oyong, Gembas
Bryonia *foetida m*	
Natural order *Cucurbitaceae*, Genus doubtful	Bolu-paït
Ditto ditto	Bolu-tekkék
Ditto ditto	Sirahan
Ditto ditto	Laron
Genus doubtful	Krembi
Genus doubtful	Kanchilan
Genus doubtful (among the Palmae)	Gligen, Mendu
Genus doubtful do. do.	Wergo
Genus doubtful do. do.	Aren

Class XXII. *Dioecia.*

Pandanus littoralis	Pandan Passir
Pandanus	Soge-mane
Cycas revoluta	Pakis ta-ji
Excaccaria Agallocha	Kayu-Gitta
Brucea	Patty-lallar
Antidesma	Andi-andi
Antidesma	Andi-andi-an
Smilax China	Ri-wonno
Smilax (caule inerme)	Godong-wonno
Flacourtia	Rukkem
Flacourtia	Native name not determined
Nepenthes distillatoria	Kalok-chikko
Myristica	Kayu-ra
Sutherlandia littoralis	Dungun
Genus doubtful	Kallas, Gesto
Genus doubtful	Suru-kebo

Genus doubtful	Pu-chung [guyu
Genus doubtful	Tembaga, Teng-gulung-
Genus doubtful	Serrut

Class XXIII. *Polygamia.*

Parietaria	Derrês
Celtis orientalis	Angrung
Terminalia	Ketappan
Mimosa	Bangkong
Mimosa	Jengkol
Mimosa	Goleng
Mimosa	Kedawung
Mimosa	Komlandingan
Mimosa	Pette
Mimosa	Sengon
Mimosa	Seppat
Mimosa	Tekkik
Mimosa	Werru, Wangkal
Ficus	Awar-awar
Ficus	Bulu
Ficus	Bulu-empan
Ficus	Gondang
Ficus	Karet
Ficus	Konyal
Ficus	Kebbêk
Ficus	Lo
Ficus	Luwing
Ficus	Rempelas
Ficus	Weringin
Ficus (variety of the pre- [ceding)	Pang-gang
Ficus	Randan
Ficus	Wiloddo
Ficus	Se-pre
Ficus	Pellus

Class XXIV. *Cryptogamia.*

Ord: II. Filices or Ferns

Ophioglossum (see Hydroglossum willd) Her- [bario No. 706

Acrostichum	Herbario	No. 662
Acrostichum	ditto	No. 754
Acrostichum	ditto	No. 829
Pteris	ditto	No. 672
Pteris	ditto	No. 733
Pteris	ditto	No. 762
Pteris	ditto	No. 819
Pteris	ditto	No. 976
Blechnum	ditto	No. 634
Blechnum	ditto	No. 735
Blechnum	ditto	No. 753
Blechnum	ditto	No. 820
Blechnum	ditto	No. 821
Blechnum	ditto	No. 833
Hemionitis	ditto	No. 740
Hemionitis	ditto	No. 745
Hemionitis	ditto	No. 752
Meniscium	ditto	No. 653
Meniscium	ditto	No. 760
Meniscium	ditto	No. 818
Asplenium	ditto	No. 674
Asplenium	ditto	No. 688
Asplenium	ditto	No. 738
Asplenium	ditto	No. 751
Asplenium	ditto	No. 822
Asplenium	ditto	No. 824
Asplenium	ditto	No. 825
Asplenium	ditto	No. 826
Asplenium	ditto	No. 827
Davallia	ditto	No. 854
Davallia	ditto	No. 855
Davallia	ditto	No. 856
Polypodium	ditto	No. 675
Polypodium	ditto	No. 754
Polypodium	ditto	No. 759
Polypodium	ditto	No. 743
Polypodium	ditto	No. 744
Polypodium	ditto	No. 745
Polypodium	ditto	No. 757
Polypodium	ditto	No. 761

Polypodium	Herbario	No. 835
Polypodium	ditto	No. 836
Polypodium	ditto	No. 837
Polypodium	ditto	No. 838
Polypodium	ditto	No. 839
Polypodium	ditto	No. 840
Polypodium	ditto	No. 841
Polypodium	ditto	No. 842
Polypodium	ditto	No. 843
Polypodium	ditto	No. 844
Polypodium	ditto	No. 845
Polypodium	ditto	No. 846
Polypodium	ditto	No. 847
Polypodium	ditto	No. 848
Polypodium	ditto	No. 849
Polypodium	ditto	No. 850
Polypodium	ditto	No. 866
Polypodium	ditto	No. 867
Polypodium	ditto	No. 868
Polypodium	ditto	No. 869
Polypodium	ditto	No. 870
Polypodium	ditto	No. 871
Polypodium	ditto	No. 872
Polypodium	ditto	No. 873
Adianthum	ditto	No. 756
Adianthum	ditto	No. 759
Adianthum	ditto	No. 850
Adianthum	ditto	No. 851
Lonchitis	ditto	No. 741
Lonchitis	ditto	No. 742
Scolopendrium	ditto	No. 828
Trichomanes	ditto	No. 747
Trichomanes	ditto	No. 749
Trichomanes	ditto	No. 750
Trichomanes	ditto	No. 755
Trichomanes	ditto	No. 852

3 Genera related to the Ferns.

Lycopodium	Herbario	No. 757
Lycopodium	ditto	No. 817

Lycopodium	ditto	No. 851
Lycopodium	ditto	No. 852
Lycopodium	ditto	No. 853
Lycopodium	ditto	No. 854
Lycopodium	ditto	No. 865

Order III *Musci-Mosses.*

Genus not determined	Herbario	No. 857
Ditto	ditto	No. 858
Ditto	ditto	No. 859
Ditto	ditto	No. 860
Ditto	ditto	No. 861
Ditto	ditto	No. 862
Ditto	ditto	No. 864.

AN INSCRIPTION FROM THE

KAWI,

OR

ANCIENT JAVANESE LANGUAGE.

An Inscription from the Kawi or Ancient Javanese Language, taken from a Stone found in the District of Surabaya on Java, translated into the Modern Idiom by Nata Kusuma, *Panumbahan of Sumanap (Madura) rendered into English by* Mr. Crawfurd, *and submitted to the Society by the President, the Honorable* Thos. S. Raffles.*

Swasti — Trikisi gurne bpa nyokawata waraswirat tata (894.) pralayé aáuna iwinia prasida starsmeka tremessa tatap ja agani kawikrama guruna mranamya maasúa dipena sakama-yestri-wikrama iki pramiol rekena masmabasta jayastrah nulya tita áwya besinya áprake gurne jagakam kapyan rumama kurumaba káeki warsme gita ya-na-manai.

Ikirtya kaníaya kaya karuna yayastri parakwan-dadakwap kaparua kadya yanasrani ikanti branta lanká karaya jroa satwa ri-te-pabátama kaya kwa-bete nirunya raswikerma-nutagu karunas-sajaya delaganya manrapa.

Kariran-girji-trerarinta-bara-bangrah palanta basani prakyaranya gunatraye-pisa hanya tetarsyana giopama yete-birsubiran-dwanya sekrenaksi iwa kagakwari sa sri kakirta.

Pradwiya wapati Sri Kunakúa khwa-yaja ká syatmaka kalumachana sakasarasya hi siyata sugatapatyasanya. Wedya haraye hásamuda me-

* In sudmitting this translation to the public it is necessary to observe that the translator found the original in many parts very obscure, that the translation is of necessity very free, and rather to the considered as approximating to the sense of the original, than a verbal translation.

gati hardi sasti-srinya nakúggati jayeki-raga ja-ratnyi. Makdaku nimi watu-desmastra mila mardyaksi bananata. Pratika gudi gunantatany-manyanwa kabotrana yini-nayaka wanandi sri-habrakala nerpa kirna rabata kagana kasmanjra hura gundra kawawirana tanranrasa not-gerta yetata bamtaketa kedya-tanaya legam gatani nankreti ana-chaki sabwapratima praragi raga yekaswani tan-yudyata satrugami akumtra kumega dalane putra pragug-nugujam.

Sri Makuja Wása wardana iki pratinye-nerna manpa mendrana swinyana wása kapunastanya prasastranranya penawapya hapasya nuhinyati máke jtarup mertehabaja gunanye pradalatrin-mandwip natare pisuna-gana gerwa pitranym-natranya taluguna priyawarma-pati.

Sasida saka tipikiswa winudra janma gapwa yanudayanana prawinyatrya tanana táwri-mati weddi di gade hawahendra lan tawadyan tuhwa yen nespa suta supaya wedi tes mabasreswa. Prajwa pusakara sukal-ragira mora moyamá gawenya gunetayan saha winyentati atiga asamwa-niwindra renágaki raditya swatastanye atwat ri karma wasa iti pwarwaya kawi pera maseddandara guna-gana tarjano-turute naya herya chadamus sawasu-nyari tandra gtiwanya. Prajiga kanyeter nmanaska awagus macha-dagawada tuta jurusya putrata Dadrawisa Madya dawinaka lida lalena álunyi nekaner wakasan-nara áatara pana-pahinyu sadyakat waka ká rayana sakra-sara tita dapara de mayáawakya remanya sama sisi tatraye-ábati toda-daa-ken du durur kesaga-katya irya narkeji ner-dwir-dwra-ri-sarya samákya kinwruji larara kadwara ya nerpati Towi nywa-kastutiwar Sapradya dityeka mimunu matiji damnya-satya jigarini karani-

janu-palya mu madya pitangu jaru jaga talasya gagwa dakwadya nya. Humulat warmi guta prep warsa. Gug pesaya karusuwa paturuji aswas witwi pawatya pitana margyan-dapana mapagu tugu nuntasa arindra yanarir tu Sri Jalaláa Dewa Satita tamya pidatra si kerái paguguna kiwaka dalaranana mabraman gubuna ya bala nusreu masta adatap dayu dala soraha panana sasti womantra leddorana tatya nareraha hala humi nyentrik gaswat misilaniran dikena winya kasiwa naje ratu kandurnrajya nayanya pada tata haniba yarajya tri guruna tawantatas. Putra kamati tatsal repasaha saryastu manilina matis sartastrigama nyata naruru pada getasamyá gatiwiya padatya kastwastu pade daya lujudaya stenya wré tuti. Tajana bajat kedda-kamityana-tan yeka bpyap lanyaraka. Kamwinta suka japa-guruna tan-nagawame kasaraka papoguna tasima hanana katatwit tritimya pamatandrana rasya lakya yamisya inya tan nututasa malika nyulawa lagunana ta karasye báa wedhiyan japaaha misakdana wikarma katatya katatinya panutta dasmasa habigiana paliluna hamasu yaya wasya jelawitika kabekya karindra dékawa parendra mayalaka kisaja Tkamre jawaya kakirikeya mapeyapa beda soranunarti satata pahutya sagájarana tatapya ká pinitra rananata pagana sagatrani sadeka naratrya tatasinabalapi wata suta paltu sapada wanawala trakawágu kitisya satomana agatatya srapana dáodanana jawasa dlar ya sri dadi kasi karundu kanámarta breda ridra natan. Manyara dwinana manuparana kita panyadya kananata kagya bapa deganti warasana lagya wana sugatanane wandraraja laku myáa tannata nysya wataktama tobata kaswaka danantaru nerpa-sutanjibi pargatasnana laya maté panapasaha anyatati

wedihan naya tinya tata dutanata kanye danata kanye namatibta diyana gakanya tandan nata. Anata dapigu bistra kapásiba. Tra ridya tya akakara amábdapepa bedranta mapaawit jalani riwarara tantrata kasamya parestrin nerpati ragina dwantatya nantata kirta wadya lawas gupa narendra lelika beda anyetandi gama rika mawadya kedakanduk sinanywata dana mabida pulasta tandrada nywaga nutiye dwya pati muni sarot sakirta rama taharapusa. Mani nywara war lagerta labani kandra para siga nata gaga raga sisi tatrape pajatati tekine drade yenana radyu jakti bali nirka neraga nir wer ganiwar dina swasti hamasana dwijaya pwayá samajaya drasa jawakya dikdarana apurana wara nandranya tanana si mwa sakye sura gurn siki patyenyati te masi kastin rija bálani twasinye wer mla guwap-tá rupa wer sarurupa jiwijap pagremap te wadya sata grek jamuka sara wiwara wadyanya sá raja syatemer atata ti gurunya re nyati kepa nywa datyam ripu sima haga sriya dwipara beda matini hikap dara iga ratra akanesta. Pwar beddi di twi jayiki hata sejwarja kramenya tre marwata narje lalága de samakanya nirikitu mala sugube sá pinági pamarti mwá ika mrya kiraje lakyena. Riatyata risiya tramawa nando. yerup ser asikatya tandi kaya raba áratita hibade ranya rada nyenantu nyejo tamaya keda masajan rapu te sunnyatra sá sri matanap swe prapta rajanya winyeru patik-sri-niralá kwaya. nadan-nak-tera jatiya sramama samami manrandara adyana radadyadadana suntatan-tesya hamata mita hewismayana lra lawana tranarar lir diprawi nyata stuti muka ramanya mutyara mananrasà namu ninam-kawya maka maramira manasa nagana sayantru wantri sasad rabasya nujaya kwatap rasa-mikir-kamyarsa

kirmantri kum-grop-nengrepaninye sinuguka nani jarat matrana dama prawerna yastinjira kiranti gunatyati gerwanta wamana widyasti-nye tas mansrija tamáka dewa nrasati sarya sajinya titi.

Translation.

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Prosperity!!—Attend to what is related, and which gives excellence in this world. Wisdom is banished by death; and worth of every kind is terminated by it. Make not light of these matters, but learn what is fitting, and enlighten your mind, for this life is of no account, it is attended with uncertainty, and death is its end.

For this reason the intelligent have composed this narrative, renowned in assemblies, scented like scattered flowers. If you understand what is here related, you attain excellence.

The efforts of tyranny are as the tears of the virgin in the embraces of old age. The assailant burns with desire, the assailed shews no return. Affairs accomplished in this spirit are full of difficulty. It is unbecoming of men to shed tears, which are enemies to valour; in every situation let them behave with meekness, which resembles the stream of water that falls from the mountain and refreshes every object around. Attend to these things, and you will thereby acquire an accession of wisdom; do not alter your copy, and thus the excellence of your narrative will be displayed. Observe well this instruction in your conduct.

It is related of Raja Kunakua that he was a Prince renowned for his penetration, of gentle conversation, a lover of religion and a confirmed Sugata. His love for his people was great. The whole country was loud in his praise. He was skilled in directing the labour of his people and a strict observer of his word; the country prospered under him. The king directed this stone to be written upon, that men might behold what was inscribed, which is replete with wisdom, and that they might improve thereby. When the king fabricated this monument he took the advice of his chiefs and nobles on the excellent things inscribed upon it. All this has been divulged that the ignorant may be informed. Learn thou to judge of things from their appearance, for you have been instructed. Adorn the places of excellence, the temples of the gods, by which you wil diminish the number of your enemies, who will bow to and serve you.

The king has acquired strength from the valour of his sons Sri Makuja Wasa and Wardana, beautiful in person and mild in disposition. Should you search the world round, you would not find the equals of the two Princes, their valour is equally conspicuous; and their knowledge of the Sastras so complete that to understand them demanded no study. Their whole conduct and demeanour cooled and refreshed all around them. All women felt the intoxication of love for them, and wished themselves united to them, saying in their hearts, how skilled to give delight, they wish us in their arms, and their fame is renowned throughout the earth.

For this reason do thou learn the wisdom which is thus renowned. All the kings who became acquainted with the two princes were desirous of joining with them. Fear not death. The king's sons had no dread of princes their equals, for the affections of the whole country went with them. The people who felt the unceasing bounty of the princes, and the effects of their wishom and abilities, were glad and happy.

Relate the appearance of the kings preparing to go into the presence of the princes. It was at the time of day when the sun rides over the tops of the mountains. Excellent was their demeanour, fitting was their discourse, and they were presented with betel. They feasted and drank down to the lowest of the people, whose hearts were exceedingly rejoiced, and they eat to satisfaction.

The country was populous and prosperous. Let the relation proceed. There was a king's son whose name was Dadrawisa Madya, who rebelled against their authority, a war commenced. The prince fled. He was pursued and again gave battle. He was repartory and made no account of his enemy. The king saw the beauty of the young prince, but marked how different his conduct from a man of high birth. Be it related. When the king ordered his forces to be assembled to proceed quickly to the city to expel the wicked, he proceeded forth with and arrived at the gate of the kings of demons, and made offerings to the gods.

The armies fought, and the forces of the demon king were destroyed by the charge of their enemies. Some had their necks twisted off;

those who escapes ran away, terrified at the flight of missile weapons falling like rain The few who had courage to make a stand were dispatched at once. The flight of weapons was countless. The defeated forces hid themselves in the ditches and hollow ways, pursued unremittingly by the weapons of their enemies. The king Sri Jalalaga Dewa was killed. There was no one to contend with the army of men, no one firm to his station. Those who were seized yielded at once and begged for mercy, surrendering to the conqueror their wives and children. Thus the battle ended which had continued for half the duration of a men.

Let the story of the destruction of the conquered country be related. He replaced the nobles in their stations as before. His wisdom sought the good of the country. He elected governors and he arranged for rebuilding the city. The country was divided into three parts under three heads.

The body of the king's son was decked out and prayers offered up for it according to the practice observed for the dead. His wives, all of exquisite beauty, wished to follow him in death. They bowed and kissed his feet. They seemed determined to follow his fortune, to make it their own, and not to survive him.

Alas! exclaimed they, do not forget the expressions of our sincerity. We are fatherless; we will serve thee; we are pleased that you take us along with thee. You are our Guru. For you were skilled in the arts of love, and knew how to give joy to the heart. Such were the words of the afflicted. We will wed no more; we will acknowledge the authority of no other lord.

We will not make a second marriage, for you alone knew the arts of love. We dread the thoughts of being subjected to another's authority. We are inexperienced, and ignorant of the most approved conduct.—The times were changed. Let a spectacle complete in every respect be related, describing a narrative of excellence.

The story proceeds to say, when the kings went forth to exercise themselves, their train slowly following, they arrived at the village of Jawaya, having deep ravines to the left side, within which were seen rare objects. They halted delighted to observe Pandan flowers floating in order upon the water, as if they had been obeying an order to that effect. The appearance of sky and of the clouds seemed preparing to usher in the night; the day closed and it became dark. They assembled in the forest and lighted great torches to prepare against the wild beasts, after some time the bounty of the king was distributed, excellent food, all kept awake. It was passing cold; all trembled and their arrangement was broken—In the morning they again put themselves in order, and prepared to march forward. The king was presented on the way with gifts. The people sounded the praise of the king's sons, wishing they might have no rivals, that they might have no occasion to retreat from the battle, but that their enemies might be terrified at their presence, that their aspect might be bright and not turn pale in the battle, and that their rank might be exalted.

It is related that there was a female of passing excellence, her beauty was far-famed, she was without-blemish; all men felt the pangs of love for her, and she became the constant object of

their discourse. Her whole demeanour was becoming; her excellence fitted her to be the consort of a king, the gift of the gods to him. That king was just in his conduct towards his subjects; as long as he reigned no wickedness was committed in the country. His people were happy and rich, the effects of his bounty. His liberality towards the poor and dependent was without interruption. His learning was moreover complete; assuredly a of the Dewas. Whatever he imagined was right. He was therefore loved and feared throughout the country.

This prince possessed discernment of talent above all the princes his equals inpower. He was ready to pardon those who erred. His religious austerities in search of the prosperity of his country were so great that he did not allow himself to sleep. Criminals disappeared without effort. His knowledge equalled that of a Pandita. An enemy came renowned for his skill in war. He invaded the country. The numbers of his army were unknown. The adverse forces commenced a nocturnal combat with equal valour, none flinching. The darkness of the night encreased. The king's army charged the enemy in a body, dealing out and receiving cuts and stabs, shrieking and shouting. The king's army could not withstand the darts that were showered upon them, they began to flinch but could not find the gate; the army was vanquished, many were killed; those mained, who dreaded the anger of the king like a sage. The discomfiture of his force is not related. The army was thrown into confusion with a noise like the fall of a mountain, or like the sea in-

undating a city. Thus happened the defeat of the king's army, and in this manner was the power transferred to other hands.—The women were met mourning the death of the fallen king.

She who dwelt on the loss of her lord was found motionless from grief, in beauty like the godesses Ratti or Supraba, Her breasts superior in loveliness to ivory. Her complexion excelled burnished gold glittering. Such was the spouse of the fallen prince. Forthwith arrived the victorious king in anxious search for the princess.

He found her under the shade of a Tanju tree by a mound raised in shape of a mountain where pious austerities are performed. Her maids mourned their fallen lord, their countenances pale with grief. Thus also the surrounding flowers and plants, as if they too wished to perish and partake the fortunes of the prince. The king wondered at the sight. He praised the place of worship. In front it was studded with pearls and precious stones. The skill displayed gave pleasure to the heart which excited to devotion. The victor approached the princess and her attendants. The conquerors seized upon the wives of the nobles. Others seized the attendants. A scene of plunder ensued. The Nayakas laid their hands on such were fitting to become their wives. The beautiful with rising bosoms were seized by the chiefs. The king laid his hands on the princess and welcomed her to his bed.

COPIES

OF

Two of the Ancient Inscriptions, &c.

Copies of two of the ancient Inscriptions on Copper Plates dug up in the Vicinity of Surabaya, and now deposited in the Museum of the Society at Batavia, rendered from the ancient Kawi character into the Roman —and communicated by the President.

No. 5.

Gatine kang ram'eku dadu prayêtna maima ingarakêne Sri Maha Raja 'ngonen turung prasu maka sang Ngadararya sang Gramawyaya sedêng neran kapala-saka ngapéri Wano'ékung Dadu tinót pinét déning Satru karana Sri Maha Rajah mangkana Sri Krota Nagara sang linaring singa-buda laya ngone tinêkan dé Sri Jaya-katsêng sangké gêlang gêlang saksat prang muk'an lumampa akên krôtal pêna kêrma metra dro'aka samaya langleana mayun umariswakêna Sri Krota Nagara anerikang Nagaré tumapêl Sedênge sanjata Sri Jaya Katsêng karng ngoan têké jasun pungkal irika ta Sri Maha Rajah Mwo'ang sang arda Raja inotus dé Sri Krota Nagara, mapaga kêna sanjata Sri Jaya Katsêng mantu pama sang Arda Raja Mwo'ang Sri Maha Rajah dé Sri Krota Nagara, kunéng sang Arda Rajah saspapata danga kayu graja munggwêng padêlagan bêrma biêtsa ring kasogatan buda tarka sastra pari nama siséka danga sarya kinantaka iping sianyêtnya Sri Maha Rajah kumônakêne kang nganoeku dadu angsa yang Bêrma ikêlèmé pademalakêna rapré sasti masina Krota Rajah sang Jaya Gêndêrwa umunggwéng sala sikine ngopala ripta tamra kapang kwa déui kang

kraman iku dadu magoakêna tantra nekang wado'éku dadu an sampun sinusup s'madêk ring'get dé Sri Maha Rajah têkéng gagarnêknya salêbak wakirnya kabé marya kang sadé sangyang Bêrma ikêlêmé kasuktia déni kang rameku dadu katîmakêna lilirana déni santana prati santana nekang rameku dadumêne 'lêm têka ri dêlahing dêlaha sab.

The above is an account of the preparations of Gramawyaya (a Chief Majapait) to make war against Jaya Katseng, Prince of Gegelang, for having formerly killed Singa Buda of Tumapel.

No. 6.

Yata karananyan tumurun ngara negraha Sri Mhaha Rajah irikan raméku dadu ancsukên simîswa tantra dêg ring'git lêma swanênya iku dadu dê Sri Maha Raja têkéng gagarnêknia lêbak wukirnya babé gasuktia déni kang raméku dadu katêmu talilirana déni santana prati santana nekanh raméku dadu mîne 'lêm têka ring dêlahaning dêlaha sang septanya mari tékang wanwa iku dadu minakang sadé sangyang Bêrma ik'lêmé marika parêbea para apan sampun jadi sêma swa tantra dêg ring'git de Sri Maha Rajah kunêng nimeta Sri Maha Rajah panêmala pangka Sang'yang Bêrma ikêlemé nangan'noeku dadu mapakene rikang raméku dadu Sri Jaya Katseng ngone ri'uwus neran umelangaken Sri Krota Nagara gumegwa nikang nagara daha anotujar Sri Jaya Katseng sinarangana kîne rikang sapa

ngada'epa iré nikang santapa tan pang arepakena giango atyan tageng nikang duka tumame sira ri teka Sri Maha Rajah irikang raméku dadu atyan tamarma sambrama wilasa nekang raméku dadu maka biekti pangaturakenya sakta pana mo'ang bras atohorang atatîne Sri Maha Raja wichaksana witsanemita Sri Maha Rajah tan Katema pinét neng satru maka akasan tumodu aken umatirakan ring 'nu maka ing aning sine kang rameku dadu poékang atyiang ta marma sam Bema wilasa e Sri Maha Rajah yatikang dadiaken parama Sautu medi Sri Raja Sri Maha Rajah mwamrachu déngsa saksat swîrga ngatilar jagat palaka tan wenang tan malesa nge sukaring uwasa wéh inakamdi.

Gramawijaya demands the Country of Jaya Katsing, who at first refuses to give it up, till hostilities commence, when, after being beaten a little, he surrenders it to Gramawijaya.

BYNA
WOORDELYL TRANSLAAT
VAN EEN
JAVAANSCH GESLACHT-REGISTER,
Van de Vorsten van Java.

Byna woordelijk Translaat van een Javaansch geslacht-register van de Vorsten van Java.

Dit gedenkschrift verhandelt de afkomst van de Javasche alleen-heerschers, beginnende met *Adam.*—Deze had onder zijne zonen eenen genaamd *Sis.*—*Sis* gewan *Noertjaya*, en deze weder *Noerroso.*—Zijn zoon was *Sang Jiwang-woedie*, die *Sang Jiwang Toengal* voortbragt, wiens zoon was *Betoro goeroe*, dewelke de goden van de etherial regeerde.—Zyne zonen waren vijf in getal, met name *Sang Jiwang Saboe*, *Bromo kito*, *Mah hodewo*, *Wisnoe*, vorst over alle de onzigtbaren, terwijl te *Giling Wesie* regeerde *Mahho Rodjo Watoe Goenoeng*, die dertig familie personen had, zoon van eene der vrouwen van *Betoro Goeroe*, genaamd *Dewie Sinto.*—Deze *Mahho Rodjo Watoe Goenoeng*, wierd als kind door zijne moeder *Dewie Sinto* mishandeld, en met de schepper Malah Boedak op het hoofd geslagen, zoo dat dezelve ging dwalen, en tot jaren van onderscheid gekomen zijnde, huwde hij onwetend zijne moeder, na de dood van zijn' vader *Betoro Goeroe*, van daar de bijspreuk: „ Mijn zoon is mijn man"—zoo dra echter *Dewie Sinto* dit ontdekte, vergde zij, dat haar zoon voor zijne tweede vrouw een' Engel zoude nemen.—Haar zoon, en man *Rodjo Watoe Goenoeng* voormeld, steeg daar op in de Etherial, alwaar hij de goden beoorloogde, dewelk hunne toevlugt tot zijn' broeder den voorn. *Wisnoe*, vorst der onzigtbaren namen—*Rodjo Watoe Goenong*, aldaar den slag daar door verliezende, wierd hij met zijn dertigtal familie-personen in den afgrond gestort; echter door het

smeeken en bidden van zijn moeder, en vrouw *Diwie Sinto*, wierd hij met zijne familie ten hemel verheven, en daar om zijn er dertig dagen in eene maand.—

Betoro Goeroe, de vader van de vijf gebroeders voormeld, gebood als toen, dat van zijn' tweeden zoon *Bromokito* voorneemd, de vorsten van Java afstammen zouden, en dezelve teelde daar op *Jiwang Bramanie*, die weder *Dewie Praworo*, en deze *Parie Kenno* voortbragt. *Parie Kenno* gewon *Bogo Wono Manangsa*, en deze *Sakroe*.—*Sakroe* gewon *Sakrie*, en deze *Polosoro*, van wien *Habie Yoso* voortkwam, en van dezen weder *Pandoe Dowo Noto*, de vader van den in de oude Javasche geschiedenis, zoo zeer beruchten *Hardjoeno*, wiens zoon was *Bimanjoe*.—*Bimanjoe* gewon *Parie Kerit*, en deze *Hoedo Djono*.—*Hoedo Djono* gewon *Gendro Djono*, en deze *Djoyo Boyo*, vorst van Kadierie. —*Djoyo Boyo* gewon *Djoyo Mie Djoyo*, en deze *Djo Mie Sono*, de vader van *Walie Driyo*, uit wien *Koesoemo Wie Tjitro* geteeld wierd — Zijn zoon was *Tjitro Somo*, die *Pontjo Drio* gewon.—*Pontjo Drio* gewon *Hangling Dermmo*, vader van den vorst van Selo Tjolo.—*Selo Tjolo* gewon *Srimo Poegoeng*, en deze *Kendie Hawan*, en deze weder *Harsi Ka Doedoe*, vader van *Lemboe Hamie Loewih*, vorst van Djangolo, wie den beruchten *Tandjie* voortbragt, wiens zoon was *Laleeyan* vorst van Padja-djaran; deze gewon *Bandjarransarie*, zijn' opvolger en deze weder *Moendingsarie*, vader van *Srie Moending Wangie*, deze won Radeen *Soesoeroeh*, die zich in het oosten opwierp, tot vorst van Modjo Paid, en de hoofdplaats van dien naam gesticht heeft, en die in honderd jaren aldaar zeven opvol-

gers heeft gehad, waar van de laatste was *Browio Djoyo*, gehuwd aan eene Princes van Tjempo.— De zoon van den gemelden *Browidjoyo* gewon bij de Princes *Roseksie*, *Haryo Dilah*, die tot vorst van Palembang verheven wierd, en een andere zoon van genoemden *Browidjoyo*, geteeld bij eene Chinesche Princes genaamd Radeen *Patah*:— Deze was de leerling van den Arabischen Priester *Soeroehoenang Ampel* te Sourabaija, en de eerste Mahometaansche vorst van Java.) Hij was de stichter van de Hoofdplaats te Demak, alwaar dezelve over Java regeerde, en de verwoester van de Bramiensche religie was, met drie van zijne afstammelingen, die almede na den anderen te Damak hof gehouden hebben.—Een derde zoon van den opgenoemden *Browidjoyo* gewonnen bij *Wandan Koening* genaamd Raadeen *Bondan Kadjawan*, die besteed was te Taroeb, na de verovering van Modjo Paid, door den Sulthan van Damak, wierd tot schoonsoon aangenomen, door *Kiydi Ageng* te Taroep, en trouwde eene dochter van denzelven, gewonnen, bij een' Engel genaamd *Roro Nawang Shi*; hij nam den naam aan van *Lamboe Petteng*, en won een' zoon, die naderhand genaamd wierd *Ki Ageng Getas Padowo*, vader van *Ki Ageng Seselo*.—Deze *Ki Ageng Seselo* bragt voort *Ki Ageng Ngennis*, denwelken de Sulthan van Padjang, tot zijn' voedsterling aangenomen heeft.—Deze Sulthan van Padjang, was een zoon van eene Witte Kaaijman de vorst van zijn geslacht, en voor dat dezelve zich tot Sulthan van Java opgeworpen heeft, was hij eerst opgekweekt door Njaij *Rondo* van Solotiga, en had daar na gediend bij den Patingie van Solotiga, en

van dezen bij den Loerah of Schout van het dorp *Pagadjoeran*, overste van de rijst-culture, onder laatsten Sulthan van Damak, door wien hij tot pagie aan het hof van dien vorst aangenomen wierd.—De Sulthan van Damak bekend zijnde met de voorzegging wees naderhand dezen zijnen pagie een verblijf te Padjang toe, alwaar hij zich na den dood van zijn' vorst tot Sulthan liet uitroepen, en nam *Ki Ageng Ngennis* voornoemd onder zijne bescherming niet alleen, maar beschonk hem met het land Lawian.

De zoon van dezen *Ki Ageng Ngennis* was *Ki Ageng Pamannahan*, stichter van de Mattarm, alwaar hij de naam van *Ki Ageng Mattarm* aannam. Zijn zoon was *Radeen Bagoes*, dewelke door den Sulthan van Padjang voornoemd weder uit dankbaarheid aangenomen wierd onder den naam van *Radeen Ingebey Lorring Passar*, en na den dood van zijn' eigen vader, wierd hij door zijnen Vorst benoemd tot *Panembahan Senopatie Mattarm*, en hij volgde den Sulthan van Padjang naderhand op, na deszelfs overlijden, onder den naam van Soesoehoenang *Siennaree Kadjenar*, deze was de vader van den Soesoehoenang *Soemaree Karapiak*, die geteeld heeft den grooten Sulthan *Agong Mattarm*. Dezen Vorst wierd op den troon uit Mekah bevestigd, en het was toen onder zijne regering, dat Java en de overwal in rust en vrede gebragt wierd, van de religie oorlogen, die tot hier toe alles ontroerd en verwoest hadden. Deze Vorst wierd opgevolgd door zijn' zoon den Soesoehoenang *Soemaree* te Tegal-wangie, wiens hoofdstad in de Mattarm overwonnen wierd door eenen usurpateur *Troenodjoyo*, van Sampang, en den Boegenees *Intjik Karoem Galeesong*.—Die

Vorst had twee zoons, a's, den Keizer *Amang Coerat*, de eerste, die de Hollanders ingeroepen heeft, en den Pangerang *Poegeer*.—Gemelde Keizer *Amang Coerat*, wierd opgevolgd door zijn' zoon Soesoehoenang *Kendang*, maar wierd door zijn' Oom Pangerang *Poeger* voormeld overweldigd, met behulp der Hollanders, over mishandelingen, hem *Poeger* aangedaan.—Deze Prins verhief zich toen tot Soesoehoenang *Pakoeboeono*, na dat zijn neef gevangen genomen was. Zijn zoon volgde denzelven op, onder den naam van Keizer *Praboe Amang Coerat*, vader van Prins *Mancoeboemine*, den eersten Sulthan van Djokjo. Deze Keizer *Amang Coerat* wierd opgevolgd door zijn' zoon den Keizer *Pacoeboeana*, den tweeden, begraven te Lawean, halve broeder van de eersten Sulthan van Djokjo voormeld. En deze Keizer *Pakoeboeana*, de tweede, is door zijn' neef *Maas Grendie*, met behulp der Chinezen uit zijn' Kraton te oud Kartasoera gejaagd; op denzelven volgde de Soesoehoenang *Pakoeboeana*, de derde, de vader van den tegewoordigen Soesoehoenang, den vierden van dien naam.

NARRATIVE

OF THE EFFECTS OF THE ERUPTION

FROM THE

Tomboro Mountain,

In the Island

OF

SUMBAWA;

On the 11th and 12th of April 1815.

Narrative of the effects of the Eruption from the Tomboro Mountain in the Island of Sumbawa on the 11th and 12th of April 1815,—communicated by the President.

To preserve an authentic account of the violent and extraordinary Eruption of the Tomboro Mountain on Sumbawa in April last, the Honorable the Luitenaut Governor required from the several Residents of districts on this Island, a statement of the circumstances that occurred within their knowledge, and from their replies the following Narrative is collected—it is perhaps incomplete until some further accounts are received of the immediate effects upon the Mountain itself—but the progress is sufficiently known to render interesting a present account of a Phenomenon which exceeds any one of a similar description on record. The first explosions were heard on this Island in the evening of the 5th of April; they were noticed in every quarter, and continued at intervals until the following day. The noise was in the first instance almost universally attributed to distant cannon; so much so that a Detachment of Troops were marched from Djocjokarta, in the expectation that a neighbouring Post was attacked, and along the Coast boats were in two instances dispatched in quest of a supposed ship in distress.

On the following morning, however, a slight fall of ashes removed all doubt as to the cause of the sound, and it is worthy of remark, that as the Eruption continued, the sound appeared to be so close that in each district it seemed near

at hand; it was attributed to an Eruption from the Marapi, the Gunung Kloot or the Gunung Bromo.

From the 6th, the sun became observed: it had every where the appearance of being enveloped in fog, the weather was sultry and the atmosphere close and still; the sun seemed shorn of its rays, and the general stillness and pressure of the atmosphere foreboded an Earthquake. This lasted several days, the explosions continued occasionally, but less violently and less frequently than at first. Volcanic ashes also began to fall, but in small quantities; and so slighty as to be hardly perceptible in the Western districts.

This appearance of the atmosphere remained with little variation until the 10th of April, and till then it does not appear that the Volcano attracted much observation, or was considered of greater importance than those which have occasionally burst forth in Java. But on the evening of the 10the Eruptions were heard more loud, and more frequent from Cheribon Eastward; the air became darkened by the quantity of falling ashes, and in several situations, particularly at Solo and Rembang, many said that they felt a tremulous motion of the earth. It is universally remarked in the more Eastern districts, that the explosions were tremendous, continuing frequently during the 11th and of such violence as to shake the houses perceptibly; an unusually thick darkness was remarked all the following night, and the greater part of the next day. At Solo, on the 12th at 4 P. M. objects were not visible at 300 yards distance. At Grisse and other districts more Eastward, it

was dark as night the greater part of the 12th April, and this saturated state of the atmosphere lessened as the cloud of ashes passed along and discharged itself on its way. Thus the ashes, which were eight inches deep at Baniowangie, were but two in depth at Sumanap and still less in Grissie; and the sun does not seem to have been actually obscured in any district Westward of Samarang.

No description of mine, however, can so well express what happened as the extracts from the reports at the several places, and in presenting those from Grissie, Sumanap and Baniowangie it will be sufficient to observe that the remarks there made are applicable also to all the other districts, only in a lesser degree, as the scene became more distant from the cause of the phenomena.

Extract from a Letter from Grissie.

"I woke in the morning of the 12th, after what seemed to be a very long night, and taking my watch to the lamp found it to be half past eight o'clock, I immediately went out and found a cloud of ashes descending; at 9 o'clock no day light—the layer of ashes on the terrace before my door at the Kradenan measures one line in thickness; ten A. M.—a faint glimmering of light can now be perceived overhead: half past 10—can distinguish objects 50 yards distant: 11 A. M.—Breakfasted by Candle-light, the birds begin to chirrup as at the approach of day: half past 11—can discover the situation of the sun through a thick cloud of ashes; 1 P. M. found the layer of ashes

one line and a half thick, and measured in several places with the same results; 3 P. M. the ashes have increased one eighth of a line more; 5 P. M. it is now lighter, but still I can neither read nor write without Candles. In travelling through the district on the 13th, the appearances were described with very little variation from my account and I am universally told that no one remembers, nor does their tradition record, so tremendous an Eruption—some look upon it as typical of a change, of the re-establishment of the former Governement; others account for it in an easy way by reference to the superstitious notions of their legendary tales, and say that the celebrated Nyai Loroh Kidúl has been marrying one of her children, on which occasion she has been firing salutes from her supernatural Artillery. They call the ashes the dregs of her Ammunition."

Extract of a Letter from Sumanap.

" On the evening of the 10th the explosions became very loud, one in particular shook the Town, and they were excessively quick, resembling a heavy cannonade. Towards evening next day the atmosphere thickened so much, that by 4 o'clock it was necessary to light candles. At about 7 P. M. of the 11th, the tide being about ebb, a rush of water from the Bay occasioned the River to rise four feet, and it subsided again in about 4 minutes; the Bay was much agitated about this time, and was illuminated from a Northerly direction. On the Island of Sahotic, fire was seen distinctly at shorta distance to the South-east. The uncommon

darkness of this night did not break till 10 and 11 A. M. of the 12th, and it could hardly be called day light all day. Volcanic ashes fell in abundance, and covered the earth about two inches thick, the trees also were loaded with them."

Extract letter from Baniowangie.

" At 10 P. M of the 1st April we heard a noise resembling a cannonade, which lasted at intervals till 9 o'clock next day, it continued at times loud, at others resembling distand thunder—but on the night of the 10th the explosions became truly tremendous, frequently shaking the Earth and Sea violently; towards morning they again slackened, and continued to lessen gradually till the 14th, when they ceased altogether—on the morning of the 3d April, ashes began to fall like fine snow, and in the course of the day they were half an inch deep on the ground; from that time till the 11th the air was constantly impregnated with them, to such a degree that it was unplasant to stir out of doors—on the morning of the 11th the opposite shore of Bali was completely obscured in a dense cloud, which gradually approached the Java shore and was dreary and terrific—by 1 P. M. candles were necessary, 4 P. M. it was pitch dark, and so it continued uutil 2 o'clock of the afternoon of the 12th, ashes continuing to fall abundantly: they were 8 inches in depth at this time. After 2 o'clock it began to clear up, but the sun was not visible till the 14th, and during this time it was extremely cold—the aches continued to fall, but less violently, and the greatest depth, on the 15th of April, was 9 inches."

All reports concur in stating that so violent and extensive an Eruption has not happened within the memory of the oldest inhabitants, nor within tradition. They speak of similar effects in a lesser degree, when an eruption took place from the Volcano of Carang Assam in Bali about 7 years ago, and it was at first supposed that this Mountain was the seat of eruption in the present instance. The Balinese attributed the event to a recent dispute between the two Rajahs of Bali B'liling, which terminated in the death of the younger Raja by order of his Brother.

The haziness and heat of the atmosphere and occasional fall of Volcanic ashes continued until the 14th, or in some parts of the Island until the 17th of April; they were cleared away universally by a heavy fall of rain, after which the atmosphere became clear and more cool, and it would seem that this seasonable relief prevented much injury to the crops, and removed an appearance of epidemic disease which was beginning to prevail. This was especially the case at Batavia, where, for the two or three days preceding the rain, many persons were attacked with fever. As it was, however, no material injury was felt beyond the districts of Baniowangi; the cultivators every where took the precaution to shake off the ashes from the growing Paddy as they fell, and the timely rain removed an apprehension, very generally entertained, that insects would have been generated by the long continuance of the ashes at the root of the plant. In Rembang, where the rain did not fall until the 17th, and the ashes had been considerable, the crops were somewhat injured;

in Grissie the injury was less, but in Baniowangi and the adjacent part of the Island, on which the cloud of ashes spent its force, the injury was more extensive—126 Horses and 86 head of Cattle also perished chiefly from want of Forage during a month from the time of the Eruption.

Having thus collected the principal circumstances that were observed on the Island of Java, we will approach the seat of the Eruption. Its local affects have been ascertained by Lieutenant *Owen Phillips*, who proceeded to Sumbawa for this purpose, and was charged to distribute to the sufferers a supply of rice, dispatched by this Government on hearing of the extreme distress to which the Inhabitants of Sumbawa had been reduced.

The Noquedah of a Malay Prow from Timor had reported that on the 11th April, while at sea far distant from Sumbawa, he was in utter darkness; that on his passing the Tomboro Mountain at a distance of 5 miles, the lower part of it was in flames, and the upper part covered with clouds; he went on shore for water and found the ground covered with ashes to the depth of three feet, several large prows thrown on the land by a concussion of the sea, and many of the Inhabitants dead from famine. On leaving Sumbawa he experienced a strong current to the Westward, and fell in with great quantities of cinders floating on the sea, through which he with difficulty forced his way; he was surrounded by them the whole of the night of the 12th, and says they formed a mass of two feet thick, and several miles in extent — This person states that the Volcano of Carang

Assam in Bali, was in commotion at the same time: and it appears from the several reports that a greater rumbling than usual was heard in the Mountains in the Rembang district, as well as in the Gunung Gedé in the Preanger Regencies, but after a strict enquiry it does not appear that any simultaneous movement or connection could be traced on this occasion along the chain of Volcanic Mountains running East and West in Java.

The Honorable Company's Cruizer Benares was at this time at Macasser, and the following official report, received from the commander of this vessel, confirms the circumstances already related.

" On the 5th of April a firing of cannon was heard at Macasser, continuing at intervals all the afternoon, and apparently coming from the Southward: — towards sun-set the reports seemed to have approached much nearer and sounded like heavy guns with occasional slight reports between. Supposing it to be occasioned by Pirates, a Detachment of Troops was embarked on board the Honorable Company's Cruizers Benares and sent in search of them, but after examining the neighbouring Islands, returned to Macasser on the 8th without having found any cause of the alarm. During the night of the 11th, the firing was again heard, but much lower, and towards morning the reports were in quick succession, sometimes like that they shook the ship, as they did also the houses in Fort Rotterdam. Some of them seamed so near, that I sent people to the mast-heads to look out for the flashes, and weighed at day dawn, proceeding to the Southward to as-

certain the cause. The morning of the 12th was extremely durk and lowering, particularly to the Southward and S. W. the wind light and from the Eastward—at 8 A. M. it was apparent that some extraordinary occurrence had taken place; the face of the heavens to the Southward and Westward had assumed a dark aspect, and it was much darker than before the sun rose; as it came nearer it assumed a dusky red appearance, and spread fast over every part of the heavens; by 10 it was so dark that a ship could hardly be seen a mile distant; by 11 the whole of the heavens were obscured, except a small space near the horizon to the Eastward, the quarter from which the wind came. The ashes now began to fall in showes, and the appearance was altogether truly awful and alarming. By noon the light that had remained in the Eastern part of the horizon disappeared, and complete darkness covered the face of day. This continued so profound during the remainder of the day, that I never saw any thing to equal it in the darkest night—it was impossible to see your hand when held up close to your eyes; the ashes fell without intermission throughout the night, and were so light and subtile, that notwithstanding the precaution of spreading awnings fore and aft as much as possible, they pervaded every part of the ship.

At 6 o'clock the next morning it continued as dark as ever, but began to clear at about half past 7; and about 8 o'clock objects could be faintly discerned upon deck--from this time it began to get lighter very fast.

The appearance of the ship when day-light returned was most singular, every part being

covered with the falling matter--it had the appearance of calcined Pumice Stone, nearly the colour of wood ashes; it lay in heaps of a foot in depth in many parts of the deck, and several tons weight of it must have been thrown overboard, for though an impalpable powder or dust when it fell, it was, when compressed, of considerable weight; a pint measure of it weighed 12¾ ounces, it was perfectly tasteless, and did not affect the eyes with painful sensation, had a faint burnt smell, but nothing like sulphur; when mixed with water it formed a tenacious mud difficult to be washed off.

By noon of the 12th sun made his appearance again, but very faintly through the dusky atmosphere; the air being still charged with ashes, which continued to fall lightly all day. From the 12th to the 15th the atmosphere remained thick and dusky, the rays of the sun scarce able to pentrate through it with little or no wind the whole time.

On the morning of the 13th left Macasser and on the 18th made Sumbawa; on approaching the coast passed through great quantities of Pumice Stone floating on the sea, which had at first strongly the appearance of shoals, so much so that I sent a boat to examine one, which at the distance of less than a mile, I took for a dry sand bank upwards of 3 miles in length, with black rocks in several parts of it. It proved to be a complete mass of Pumice Stone floating on the sea, some inches in depth, with great number of trunks of trees and logs, that appeared to be burnt and shivered as if by lightening. The boat had much difficulty in pulling through it, and until we reached the entrance of Bima

Bay, the sea was literally covered with shoals of Pumice and floating Timber.

On the 19th arrived in Bima Bay, in coming to an anchor grounded on the bank of Bima Town, shoaling suddenly from 8 fathoms; hove off again as the tide was rising. The anchorage at Bima must have altered considerably, as where we grounded, the Ternate cruizer lay at anchor in 6 fathoms a few months before. The shores of the bay had a most dreary appearance being entirely covered with ashes.

From the account of the Resident of Bima it appears that the Eruption proceeded from the Tomboro Mountain, situated about 40 miles to the Westward of Bima. On the night of the 11th the explosions he represents to have been most terrific, and compares them to the report of a heavy mortar close to his ear. The darkness commenced about 7 in the morning, and continued 12 hours longer than it did at Macasser. The fall of ashes was so heavy as to break the Resident's house in many places, and render it uninhabitable, as well as many other houses in the town. The wind was still during the whole time, but the sea greatly agitated, its waves rolled in upon the shore, and filled the lower parts of the houses with water a foot deep. Every Prow and Boat was forced from the anchorage and driven on shore, and several large Prows are now lying a considerably distance above high water mark."

"On the 22d the Dispatch country ship arrived in the bay from Amboyna. It appears that this vessel had mistaken a bay to the Westward, called Sampo or Sangin bay, for Bima,

and had gone into it; the Rajah of this place informed the Officer that the whole of the country was entirely desolated, and the crops destroyed. The town of Sangin is situated about 4 or 5 leagues to the S. E. of the Tomboro Mountain; the Officer found great difficulty in the bay, a considerable distance from shore being completely filled up with Pumice Stones, ashes and logs of timber, the houses appeared beaten down and covered with ashes."

"Understanding that Messengers had been sent into the interior, I waited till the evening of the 22d and as they had not then returned owing, as was supposed, to having found the country impassable, I left the bay at 11 o'clock that night, and the next day was off the Tomboro Mountain; in passing it at about the distance of 6 miles the summit was not visible, being enveloped in clouds of smoke and ashes. The sides were smoking in several places, apparently from Lava which had flown down them not being cooled, several streams had reached the sea; a very considerable one to the N. N. W. of the Mountain, the course of which was plainly discernible, both from the black colour of the Lava contrasted with the ashes on each side of it, and the smoke arising from every part of it. The Tomboro Mountain in a direct line from Macasser is about 217 nautical miles distance."

It has been ascertained that these Eruptions of the Tomboro Mountain were heard through the whole chain of the Molucca Islands. The Honorable Company's Cruizer Teighmouth was lying at anchor at Ternate on the 5th April; between 6 and 8 P. M. several very distinct reports

like heavy cannon were heard in the S. W. quarter, which was supposed to be a ship in the offing, in consequence of which the Resident sent a boat round the Island to ascertain if it was so. The next morning, however, the boat returned without seeing any vessel in the offing and the conclusion then drawn was that it might be occasioned by the bursting of some Volcanic Mountain in that quarter. Ternate Island 5° O. N. 127° 30 E.

The Easterly monsoon, however, had at this time distinctly set in, and consequently the sounds would not be heard so loudly and distinctly in the Moluccas, as from the relative distance would otherwise have happened; they extended in the opposite direction to Fort Marlbro' and several parts of Sumatra, as appears from the following extract of a letter from thence.

" It is an extraordinary fact that precisely the same noise (taken by all who heard it to be a cannonade) occurred at several Stations along this coast at the same time, viz. the morning of the 10th April several Gentlemen heard it in Marlborough, the people from the interior came down with accounts of it, and those from the higher Doosoons spoke of a kind of ash dust which had covered the herbage and the leaves of the trees. Reports to the same effect (not mentioning any fall of ashes however) were received from Moco-moco, Laye, Saloomah, Lunnah, Padang-Gochee, Croee and Semanko. From some of these stations the Hill people came down armed, to assist against attacks which they imagined might be made upon the head factories."

"It has not appeared that any noise of this kind was heard at Padang, or much further North than Moco Moco—I have since heard that the same noise was heard at Troomon in about 2° 40' North lat. and at Ayer Bouki in about 0° 15' North lat. at all on or about the 11th April last."

There can be little doubt that the same Eruptions were heard throughout the range of the Molucca Islands, though at present no advices have been received to that effect, but even the distances of the places already noticed carry the influence of this Volcano much beyond any similar phenomenon on record. From Sumbawa to the part of Sumatra, where the sound was noticed, is about 970 Geographical miles in a direct line; from Sumbawa to Ternate is a distance of about 720 miles; and the existence of the S. E. Monsoon at the time may account for the difference of distance to which the sound was heard in the Westerly and Easterly directions; the distance also, to which the cloud of ashes was carried so thickly as to produce utter darkness, is clearly pointed out to have been the Island of Celebes, and the districts of Grissee on Java. The former is 217 Nautical miles distant from the seat of the Volcano—the latter in a direct line more than 300 Geographical miles distant.

I shall conclude this consice narrative with an extract of a letter from Lieutenant *Owen Phillips*, written from Bima on the 23d ultimo. It has been mentioned in a former part that on receiving intelligence of the extreme distress that had been occasioned by this extraordinary event, the Lieutenant Governor dispatched a

supply of rice to their relief, and Lieutenant *Phillips* was desired to proceed and adjust the delivery thereof, with instructions at the same time to ascertain as nearly as possible the local effects of the Volcano—his report is as follows:

"On my trip towards the Western part of the Island, I passed through nearly the whole of Dompo and a considerable part of Bima—the extreme misery to which the inhabitants have been reduced is shocking to behold—there were still on the road side the remains of several corpses, and the marks of where many others had been interred—the Villages almost entirely deserted—and the houses fallen down—the surviving inhabitants having dispersed in search of food."

"In Dompo, the sole subsistence of the inhabitants for some time past has been the heads of the different species of palm, and the stalks of the papaya and plantain."

"Since the Eruption, a violent Diarrhœa has prevailed in Bima, Dompo, and Saugur, which has carried off a great number of people; it is supposed by the Natives to be caused by drinking water, which has been impregnated with the ashes, and horses have also died in great numbers from a similar complaint."

"The Rajah of Saugur came to wait on me at Dompo on the 3d instant, the sufferings of the people there appear from his account to be still greater than in Dompo—the famine has been so severe that even one of his own daughters died from hunger; I presented him with 3 coyangs of rice in your name, for which he appeared to be most truly thankful."

"As the Rajah was himself a spectator of the late Eruption, the following account, which he gave me, is perhaps more to be depended upon than any other I can possibly obtain."

"About 7 P. M. on the 10th of April, three distinct columns of flame burst forth near the top of Tomboro Mountain, all of them apparently within the verge of the Crater, and after ascending separately to a very great height, their tops united in the air in a troubled confused manner. In a short time the whole Mountain next Saugur appeared like a body of liquid fire extending itself in every direction."

"The fire and columns of flame continued to rage with unabated fury until the darkness, caused by the quantity of falling matter, obscurred it at about 8 P. M. Stones at this time fell very thick at Saugur—some of them as large as two fists, but generally not larger than walnuts; between 9 and 10 P. M. ashes began to fall, and soon after a violent whirl and ensued, which blew down nearly every ho which the village of Saugur, carrying the tops as to pt parts away with it. In the part of Saugut to oining Tomboro, its effects were much more violent, tearing up by the roots the largest trees, and carrying them into the air together with men, houses, cattle, and whatever else came within its influence, (this will account for the immense number of floating trees seen at sea). The sea rose nearly 12 feet higher than it had ever been known to be before, and completely spoiled the only small spots of rice lands in Saugur—sweeping away houses and every thing within its reach."